The IRON AGE

APRIL 8, 1948

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WHITING
ELECTRIC HOISTS

The IRON AGE

Vol. 161, No. 15 April 8, 1948

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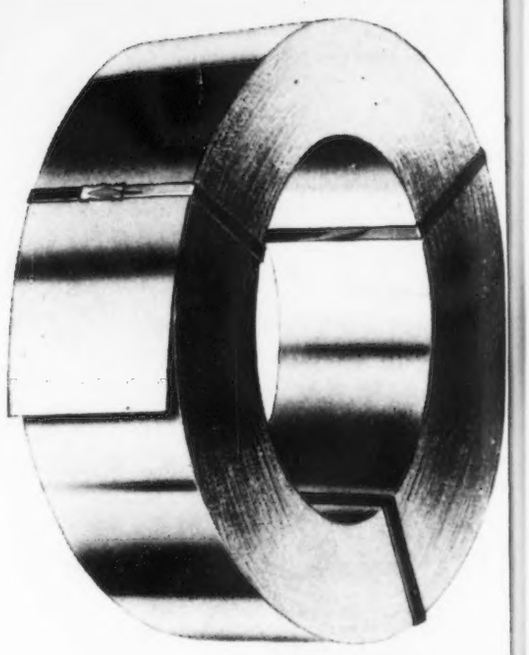

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On The Alert

THROUGHOUT the literature of authentic liberalism, penetrating the very foundations of the Christian faith, is a dominant and imperative thread, namely, that the price of liberty is vigilance. Providence has been generous to the human race. The gift of freedom is perhaps the most precious of all. Accompanying it is the absolute condition that it must not be taken for granted, that neglect and complacence will bring about its extinction.

A real crisis confronts the world. The 18th of April, the day of the Italian elections, may prove as critical in our annals as the Ides of March in the ancient world. This country is granting huge sums to help independent nations resist a modern tyrant. The President, in time of peace and during a campaign year, has asked Congress to reinstate selective service and consider universal military training. The purpose is as critical as it is clear. The only doubts are those of adequacy and time.

Here are perfectly-fashioned circumstances to render plausible the demand for a wide range of extraordinary powers. Some of these may be necessary. Many of them will have only a remote and apparent relation to the emergency. Their real purpose will be to enhance the authority and importance of ambitious bureaucrats. "Wrapped in the mantle of patriotism", the political commissars in the nation's capital may tear the Bill of Rights into shreds - and get away with it.

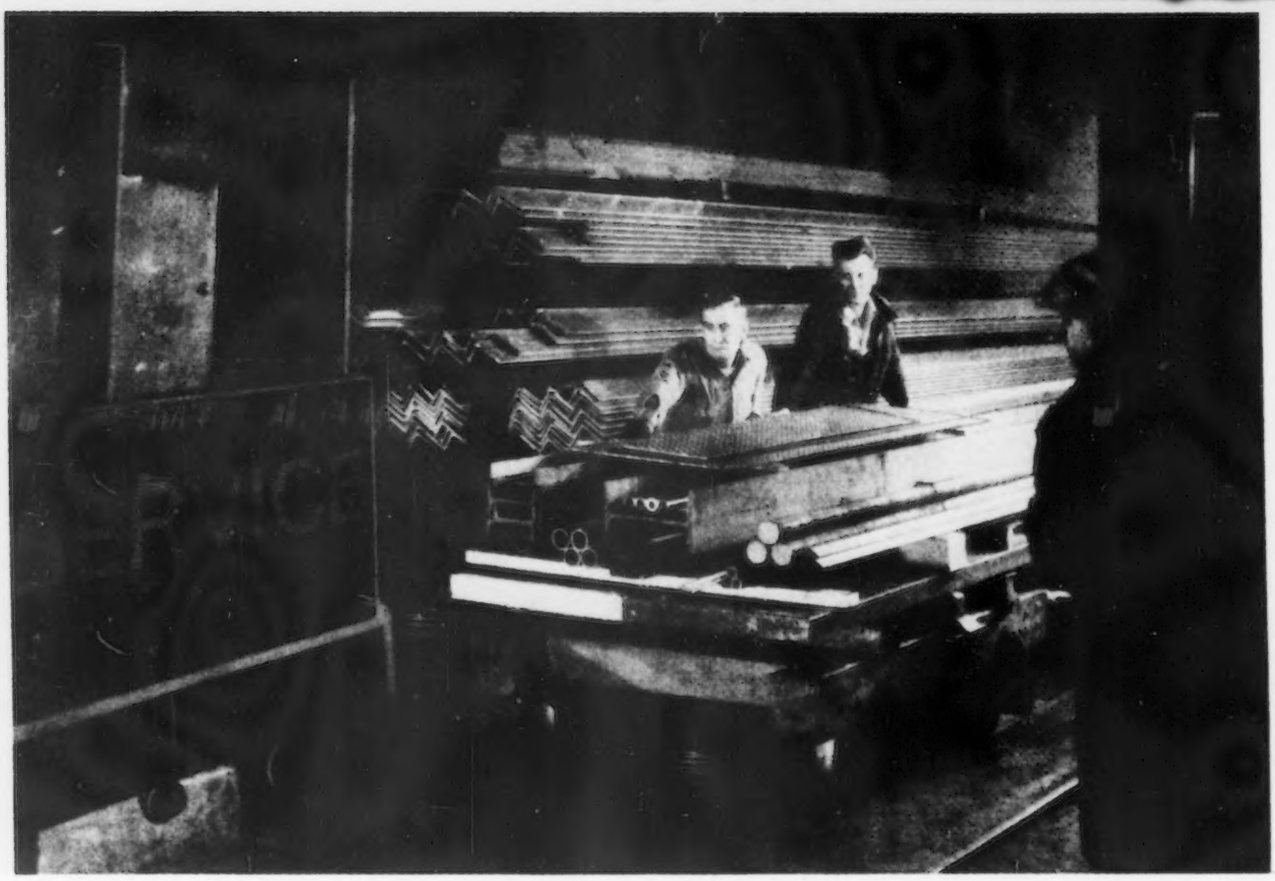
We can expect official spokesmen - aided by massive government propaganda, paid for by the intended victims - to ring anew all the changes on the worn and specious plea that a crisis demands extraordinary measures. At this point the alert citizen will examine every demand for authority with discriminating care. Only those that are definitely related to the problem, whose effects beyond reasonable doubt can justify departure from Constitutional procedure, should be considered. Such authority should be carefully defined and precisely terminated.

The steel industry is an early candidate for these dictatorial embryos on horseback. The scarcity of steel - the result of an artificial price structure - will be advanced as a plausible reason for nationalization. Allocations, priorities, production schedules, prices and profits will all be wrapped in red tape. The authority of management will be progressively curtailed. Frustration, confusion, waste, delay, and inefficiency - these are the inevitable prospects unless the American public has the good sense to perceive and the courage to insist that one of our greatest assets, the private management of industry, must be protected against bureaucratic encroachment.

For it is this management, chosen and tested in a tough competitive market, aided by free workers and shareholders allowed to retain title to their property, which constitutes the greatest single factor of superiority over the prospective foe.

If we forfeit this and submit complacently to the shackles which zealous officials would place upon us, if we can buy nothing except on a ration card, if we can produce only what an arbitrary bureaucrat permits, if we can work only where and when and as told, if we can retain only the income which the state deems adequate, if we can belch only when our leaders have indigestion, then we might just as well get on our knees at once and say "Yes" to Joe. This is the test of our vigilance.

Joseph Stagg Lawrence



Steel Hard to Get?

Demand Still Exceeds Supply But . . .

. . . this is a typical view of night loading operations at a Ryerson steel-service plant. The steels specified on several orders are on their way to a loading platform for delivery the following morning. Possibly none of these orders are completely filled—however, the fact remains, we are doing our very best to serve a large group of steel users.

Unfortunately, it often seems that the particular steel *you* want is never on hand, and it is true that we are always short of some kinds and sizes. But our stocks turn over fast. A size that is out today may be in tomorrow. And in spite of current conditions, we still believe the over-all stocks at our thirteen plants are the nation's largest.

Carbon and alloy steels, hot rolled or cold finished, and stainless steel in practically every analysis and finish are in stock, ready for your call. So do not hesitate to get in touch with us—on any requirement. You'll find that every Ryerson steel man will do everything possible to help you get the steel you need, when you need it.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

RYERSON STEEL

NEWSFRONT

► Major armament orders in the amounts being discussed in Washington will be a long time filtering down to industry. Even if they had appropriations, neither the Munitions Board nor the technical staffs of the Army, Navy and Air Force are in a position to talk specific orders now. Nor do plant operating men know what their tasks would be if an emergency arose.

► Washington sources, admitting the likelihood of steel allocation this year, doubt that the program would be fully set up--100 pct allocation--before 1949. They believe it might be politically unwise to make major product shifts before the November elections.

► Delivery periods for steel products of Western Germany amount to 4 to 5 months for railroad track material, shapes and broad-flanged beams; 8 months for bars and plates and 9 to 10 months for thin sheets, sheet piling, tubes and wire products. Up to 2 years is mentioned for galvanized material owing to the low zinc allocation.

► Crucibles made from sheet molybdenum of higher than 99.9 pct purity are expected to replace platinum crucibles in many applications. The crucibles are formed by spinning and are strong, rigid and relatively low in cost.

► John L. Lewis has again gained his end. Coal above the ground has been chewed up while the mines were down. This excess coal will not be there as a cushion if there is another walkout in July--at the end of the 80-day cooling off period. The next two and a half months will be tough on the operators. The pension controversy must be settled to prevent another walkout.

► Allison Engine Div. of General Motors Corp. in Indianapolis is planning to stop the manufacture of hydraulic lifts and allied equipment and reconvert 100 pct to Allison aircraft engine manufacture.

► Cold drawing or forming operations could be speeded up considerably, with many handling operations eliminated, if annealing were done on a continuous basis. Induction heating, using frequencies from 60 to 200,000 cycles, is being actively investigated and is expected to find wider use in industrial processes.

► Scrap supplies in Europe are getting tighter rather than looser. Export of iron and steel scrap is temporarily banned in Belgium, except with special authorization. The Belgium steel industry is also reported to have concluded an agreement with scrap dealers not to export scrap until 1951.

► Aircraft producers, looking ahead to possible large government orders, are predicting a tightening of the aluminum supply picture. At the same time, present consumers of alloy steel bars are afraid their supplies will be diverted to the aircraft makers. Deliveries on this product have jumped from 3 to 4 weeks early this year to 3 to 4 months at the present time.

► During the recent steel price fiasco Ben Fairless, U. S. Steel head, received numerous critical letters. In recent weeks have come a second round of letters--this time admitting, in many cases, that the first attitude was wrong or that the writer now saw the whole price angle in a new light. The price rise in semifinished can be marked down as an editorial binge based on hasty generalization.

► While it is true that government procurement officers have been visiting Detroit to talk to automobile officials, consensus is that the automobile production program will not be interfered with--just yet. Meanwhile the Navy has already placed riders (priority slips) in the hands of machine tool builders.

► Manufacturers of standard machine tools are skeptical of any change this year in the tax law with respect to depreciation policies. A straw in the wind of present thinking is the suggestion of one large manufacturer that the tax laws demand that 60 to 80 pct of depreciation reserves be expended within the following year or be subjected to taxes.

► Allied authorities have granted permission for resumption of aluminum production in the bi-zone area of Germany. The Lippewerk at Lunen is scheduled to produce 11,000 metric tons a year. Sufficient bauxite to begin production is already on hand. Bayernwerk at Toging is to resume production in the southern part of the zone.

► Tests are now being made to determine how much solar energy passes through the various forms of glass, such as plate and block, and how much heat gets into buildings by this means. Object of the tests is to make heating and cooling calculations more accurate.

Powder Metallurgy

... Its current Problems

... Its Prospects

Rapid expansion in the metal powder industry has resulted in many of the missteps and growing pains common to young industries. This article reviews the increased usage of powder metallurgy and suggests that wider dissemination of information and statistics and standardization of powder specifications and testing methods are essential to optimum development in the future. The industrial uses of metal powders are reviewed and the directions research is taking are discussed.

o o o

By ROBERT L. ZIEGFELD

Acting Secretary,
Metal Powder Assn.
New York

o o o

ALTHOUGH certain phases of the metal powder industry are far from new, the industry as a whole is generally considered to be a young one. Despite its youth, however, it has shown a steady growth both in volume and in the variety and quality of its products. Yet, like many young industries, it has at times surrounded itself with a veil of mystery that many believe retards development.

It was with the hope of throwing aside this veil of mystery, of avoiding misconceptions and misunderstandings about metal powders, and of spreading accurate knowledge, that the Metal Powder Assn. was formed a few years ago. It was felt to be a step in the direction of sound development of the industry through dissemination of complete statistical information and development of standardization and cooperation.

After the war there were many wild guesses as to the size of the industry, how much of the various kinds of powder were produced and how much was used for what purposes. Members of the industry did not know where they stood, a condition which often leads to bad competitive practices and unwise decisions. That situation has been at least partly corrected by accurate statistics on the principal powders and the uses to which they are put.

These statistics have revealed steady growth. In the case of grain copper powder, for instance, shipments in 1947 were 31 pct higher than in 1945, and 16 pct higher than in 1946. In iron powder, shipments in 1947 increased 55 pct over 1945 and 22 pct over 1946. Important additions were made to plant capacity for both copper and iron powder during 1947.

Moreover, these statistics fail to reveal the full growth in the iron powder branch of the industry, for they cover iron powder produced in the United States only. Imports, mainly from Sweden, have gradually increased since the end of the war until they now account for one-third of American consumption of iron powder. Whether the ingenuity of American producers, who from a modest prewar start were able to expand to meet wartime demands when imports were cut off, can continue to hold their ground against low cost foreign production with virtually no tariff protection remains to be seen.

Among the uses for metal powders, bearings and parts accounted for the largest portion of both copper and iron powder. Friction materials and graphite-metal brushes followed in that order for copper powder, and magnetic cores ranked second in the case of iron powder. The growing use of

Filter Elements by Powder Metallurgy

• • • *A star-type filter element manufactured by powder metallurgy procedures. The eight corrugations are made from sintered, pre-alloyed type 304 stainless steel powder, and are welded, by the Heliarc method, to a solid stainless steel core to make up the assembly shown. The corrugations are produced over a variety of sizes, the type illustrated measures 3 x 18 in., although up to 9 x 27 in. is possible. Filter material is supplied in three grades, the porosities ranging from 65 to 20 microns mean pore opening. Photo courtesy MicroMetallic Corp., Brooklyn.*

powder to produce magnetic cores was brought out clearly by association statistics which showed an increase of 45 pct in 1947 over 1946.

Progress has also been made in the field of standardization. A few years ago there were absolutely no standards in existence for powders or for methods of testing them. It is unfortunate that powders themselves still have not been standardized, because lack of standardization naturally adds to cost and thereby hampers expansion of use, but testing methods are becoming standardized and are eliminating confusion and disagreement between buyer and seller.

To date at least five testing techniques have been standardized and work is in progress on others. Those already recognized include methods of sampling, determination of hydrogen loss of iron powder, flow rate, apparent density, and particle size analysis. It should be a healthy day for the industry when other test methods have become standardized and when the industry can reach agreement on simplification and standardization of the powders themselves.

In the manufacture and use of metal powders and metal powder parts it is the general feeling that there has been less progress towards cooperation and dissemination of information. This is understandable because those who have pioneered in the business feel that they have acquired a "know how" and have spent time and money on development on which they do not wish others to trade.

Yet it is open to question whether all might benefit more through broader dissemination of knowledge which would lead to a better general understanding of what powder metallurgy can do for the ultimate users. So long as knowledge is restricted to the specialist in powder metallurgy,

Metal Powder Assn. Annual Meeting Program

• • • **The fourth annual spring meeting of the Metal Powder Assn. will be held Apr. 15 and 16, 1948, at the Grand Ballroom of the Drake Hotel, Chicago. Nonmembers, as well as members, of the association are invited to attend. A nominal registration will be charged for attendance at the technical program, with admission to exhibits only, at no charge. The Friday luncheon will feature George G. Ensign, director of research, The Elgin Watch Co., as speaker.**

Thursday, April 15

10:00 A.M.	Registration begins—Grand Ballroom Foyer Exhibits open—Walton Room
1:45 P.M.	Welcome by the president, H. E. Hall, and introduction of program committee chairman, George H. Tulley
2:00	"Controlled Atmosphere for Sintering," Norbert Kobel, research director, Lindberg Engineering Co.
2:45	"Metal Ceramics—A New Branch of Powder Metallurgy," Dr. Henry H. Hausner, consulting engineer, research associate, New York University
3:30	"Compressibility Factor for Metal Powders," G. E. Smith, plant superintendent, Wel-Met Co.
4:15	"Tooling for Powdered Metal Parts," Walter E. Dalby, chief engineer, Dale Corp.
7:00	Exhibits close.

Friday, April 16

9:00 A.M.	Registration begins—Grand Ballroom Foyer Exhibit open—Walton Room
9:45	"Electronic Powder Metallurgy," Charles C. Neighbors, Magnetic Powders, Inc.
10:30	"Testing of Metal Powder Bearings," D. S. Urquhart, development engineer, U. S. Graphite Co.
11:15	"Sintering of Brass Compacts," H. C. Miller, vice-president, Charles Hardy, Inc.
12:00	"Possibilities for Metal Powders in the Field of Agricultural Equipment," F. C. Buck, research dept., International Harvester Co.
12:45 P.M.	Luncheon, Gold Coast Room, Speaker, George G. Ensign, director of research, The Elgin Watch Co.
3:00	Exhibits close.

many argue that the field of metal powders is thereby restricted. As a result there has been a tendency for manufacturers of assembled articles who have found considerable use for metal powder parts in their products to install small powder metallurgy departments in their own plants. For that matter, even some of the large metal powder parts producers are subsidiaries of companies making assembled articles and the parts are produced both for the parent company and outside concerns. This situation is not unlike the diecasting industry in which there are firms who do nothing but diecasting for outside concerns, others who do work for outsiders as well as their own organizations, and still others which are small departments of larger companies who use diecastings in their products.

The field of usefulness of metal powder parts is forever broadening. It ranges from model trains, clocks and locks to tractors, automobiles and farm equipment. More and more manufacturers are recognizing the economy of metal powders for large runs on small parts. These are the tried and established uses of metal powders.

Research is continually leading into new fields. Perhaps the most interesting development work is that being conducted at California Institute of Technology on porous metals for sweat cooling for use at extremely high temperatures as in jet propulsion. The controlled porosity thus attained permits metals to serve at temperatures well above their melting points. This research is also leading into new techniques of pressing that can be applied to larger units.

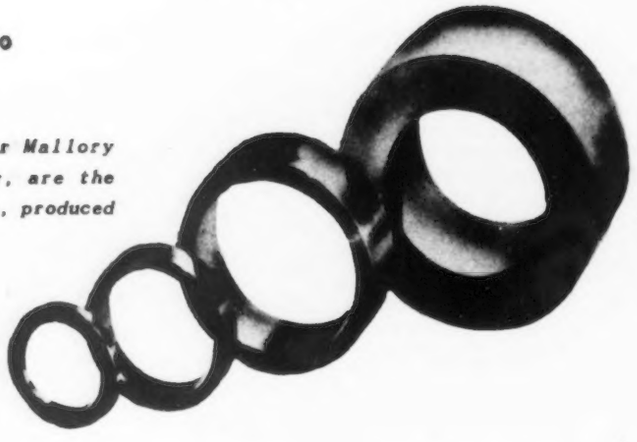
There is also the field of metal ceramic combinations. Also, alloy powders, such as brass, stainless steel, titanium-nickel and other combinations, are getting more attention.

But there still seems to be a hesitancy in many directions to divulge full information about metal powder developments. This makes it difficult to kindle interest in prospective users. Most articles and talks on the subject are couched only in broad generalities, and there appears to be a distinct need for dissemination of technical information that will help users to determine what metal powders and metal powder parts can do for them and what they are already doing for others.

Many individual companies in the metal powder industry have conducted a large amount of excellent research that can either be made the basis for a bigger, stronger industry or can be jealously guarded to a point where it will do little good to the industry as a whole. And individual units in the industry can only prosper beyond a certain point if the industry as a whole grows and prospers.

It is not intended to deny that there has been fine work done and that the metal powder industry has shown remarkable ability to grow and prosper through the untiring efforts of those who have pioneered in it. The statistics prove that. But it is felt that a greater future will lie ahead when the industry matures and leaves behind the growing pains that nearly every young industry suffers. That time does not appear to be far away.

Rotor Rings by Powder Metallurgy



A typical application for Mallory 1000, a tungsten-bearing alloy, are the rotor rings for gyroscopes shown, produced by powder metallurgy processing. This alloy is available in a wide range of shapes and sizes within the following size limitations; rings and disks up to 3 in. diam - max length 3½ in, rods bars or slabs to 7 in. long - max major dimension 1½ in, min thickness on slab at the max size limit 3/32 in. Improvements made in material and manufacturing techniques are reported to have resulted in advances with regard to uniformity, higher density, greater strength and better machinability. Data courtesy P. R. Mallory & Co., Inc., Indianapolis.

A Summary of Heat Resistant Alloys from 1200° to 1800°F

Presenting one of the most comprehensive surveys of the high temperature field ever completed, this article correlates and evaluates a large volume of scattered data on high temperature alloys. Temperature, grain size, composition and aging treatment, factors that significantly influence rupture and creep properties, are discussed in this second part of a three-part article, and the degree of control exercised in standardizing these variables is indicated. Data are also presented listing stress-to-rupture and elongation values for some of the more promising forged and cast alloys at various temperature levels.

BY NICHOLAS J. GRANT
and
A. F. FREDERICKSON
Massachusetts Institute of Technology, Cambridge, Mass.
and
M. E. TAYLOR, METALLURGIST
Metallurgical Research & Development Co., Washington

ONE of the most important functions of this article is to review and summarize the stress rupture data for leading forged and cast alloys. This is not an easy task in view of the many variables which must be weighed in evaluating the test data. As a result there will undoubtedly be disagreement with certain selected values listed elsewhere. As far as it is possible, the most representative values have been chosen. The conditions for these selections will be listed below to help in the general interpretation of the values.

As an example of the problem of selecting an average, reproducible set of data, Vitallium serves admirably. Of some 17 pages of accumulated data about ten are on rupture properties. Some of the data are overlapping and are the same tests at various test times. Seldom is the history of each test bar known. After plotting all of the rupture values on a log stress v. log rupture time curve, the following spread was measured. At 1500°F for 10-hr rupture time, the stress to rupture varies from 25,000 to 36,000 psi. For 100-hr rupture time, the stress to rupture varies from 16,000 to 23,000 psi; and for 1000-hr rupture time, the stress varies from 9,000 to 17,000 psi.

Because of such a spread, there is much room for argument regarding the optimum values or the conditions which will yield the optimum rupture properties. By the same token the elongation values also show a very significant spread and present difficulties in selecting representative figures, or reproducible values.

Alloy N-155 in itself has almost as many accumulated test data as any three other alloys grouped together. The severe lack of test bar history makes summarization an extremely slow and difficult task. The lack of carbon content values makes it difficult to group tests for purposes of comparison.

At this point, it would be worth while to summarize the factors which significantly influence rupture and creep properties and to indicate the degree of control exercised in standardizing these variables. These listed factors are not in any particular order of importance since all are interrelated generally.

Temperature: Since the values listed in table V run from 1200° to 1800°F, the test results are representative of the alloy at temperatures below the recovery temperature, or in the cold working range. Also, they are representative of the alloy in the temperature range of optimum aging, and they are representative of the alloy in the overaging zone or the zone of agglomeration of the aging precipitate. Accordingly, more than one heat treatment and aging treatment might be desirable to yield optimum rupture properties for each of the test temperatures, whereas only one treatment was often used.

For forged alloys some cold work or hot-cold work treatment might be most desirable for 1200°F test temperatures of short duration (up to 1000 hr); however, this same treatment would be highly undesirable for test temperatures of 1500° to 1800°F. It is important, therefore, to be aware of the maximum temperature of application and to treat the alloy to yield maximum rupture or creep properties for that temperature.

High values of rupture life at 1200° and 1350°F are, therefore, not important in alloys destined for use at 1500°F and higher unless these results are obtained by the same treatment which yields maximum 1500°F test properties.

The temperature at which overaging occurs is very important and has been determined for only a few alloys[4]. More measurements of this type should be made to determine the probable maximum application temperature.

With regard to solution temperatures, which are generally used for all forged alloys and iron-bearing cast alloys such as 100NT-2, the solution temperature has a large effect on the rupture

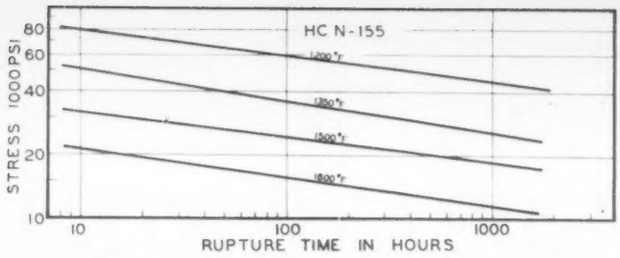


FIG. 1 - Stress rupture curves for alloy high carbon N-155 at various temperature levels.

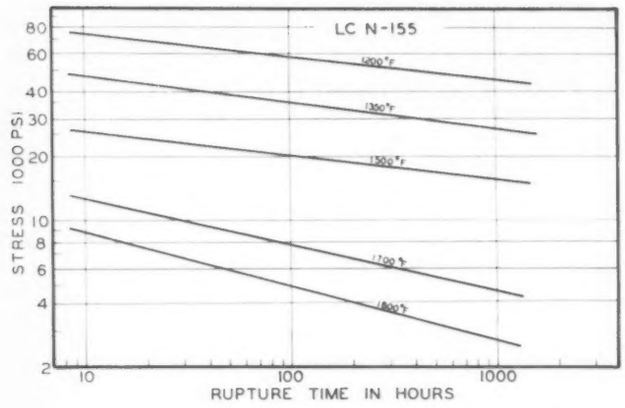


FIG. 2 - Stress rupture curves for alloy low carbon N-155 at various temperature levels.

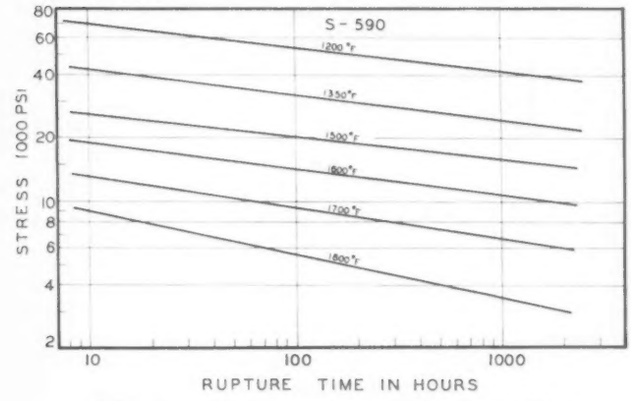


FIG. 3 - Stress rupture curves for alloy S-590 at various temperature levels.

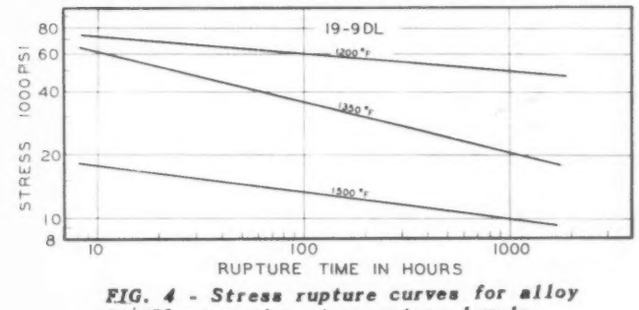


FIG. 4 - Stress rupture curves for alloy 19-9DL at various temperature levels.

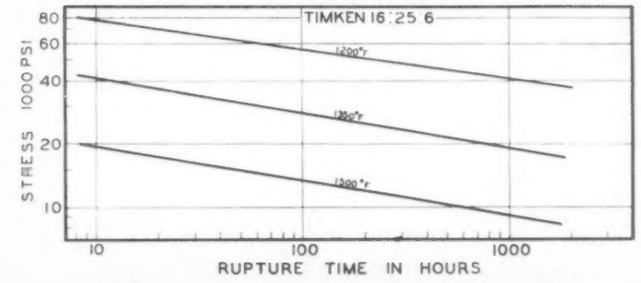


FIG. 5 - Stress rupture curves for alloy 16-25-6 at various temperature levels.

properties. Accordingly, in an alloy such as S-590 or N-155, the highest values are obtained with the highest solution treatments. Thus for S-590 a solution temperature of 2325°F yields a stronger alloy at 1500°F than does a solution temperature of 2250°F. Care must be exercised, however, to be sure that temperature control is good because 2325°F is very close to the upper limit for this alloy. Furthermore there is greater danger of warpage, etc. In heavy sections, such as rotors, solution treatments will, of course, have to be modified considerably because of the very poor heat conductivity of these alloys. There is also greater danger of developing cracks and of warpage in heavy sections which are water quenched from such high temperatures. For practical purposes a slightly lower solution temperature than the optimum might be more desirable in spite of somewhat lower rupture properties.

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Grain size variations accomplished by changing the mold preheat temperature when casting Vitallium result in a structure which at 20,000 psi and 1500°F yields a rupture life of 400 hr,

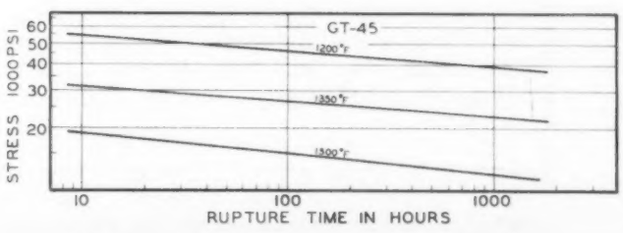

FIG. 6 - Stress rupture curves for alloy GT-45 at various temperature levels.

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In the first part of this article, THE IRON AGE, March 18, 1948, the authors listed the compositions of 53 alloys together with physical property data. This article is published by permission of the U. S. Navy Bureau of Ships. The opinions expressed here are those of the authors and do not commit the US Navy to any policy. -Ed.

and on the spacing between carbide particles in the cast dendritic pattern[6]. The entire subject of grain size control and the effect of grain size on rupture and creep properties is discussed much more completely in two other papers.[2,6]

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[6] *N. J. Grant, "Structural Variations in Gas Turbine Alloys Revealed by the Stress Rupture Test," Transactions ASM, 1947.*

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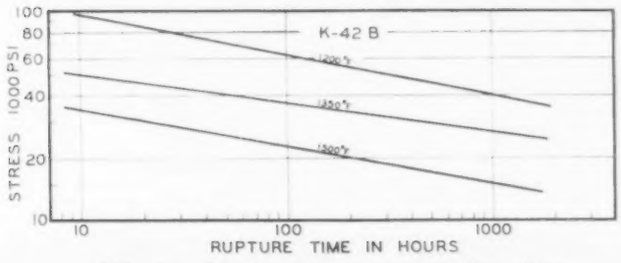


FIG. 7 - Stress rupture curves for alloy K-42 B at various temperature levels.

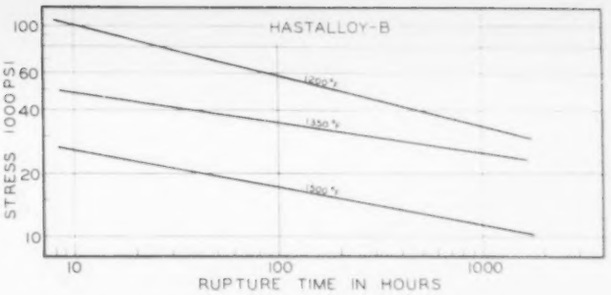


FIG. 8 - Stress rupture curves for alloy Hastalloy B at various temperature levels.

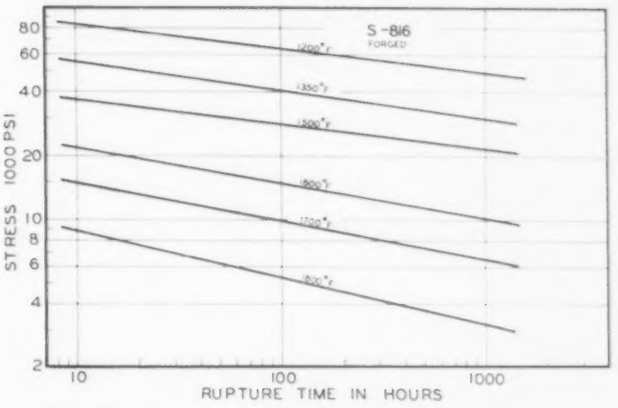


FIG. 9 - Stress rupture curves for alloy S-816 (forged) at various temperature levels.

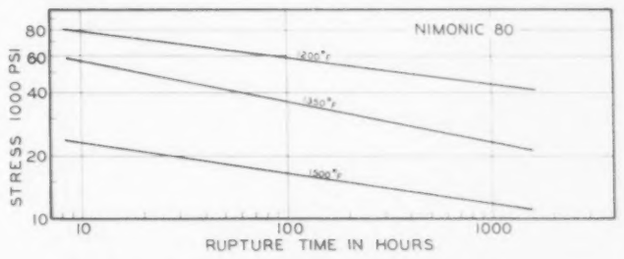


FIG. 10 - Stress rupture curves for alloy Nimonic 80 at various temperature levels.

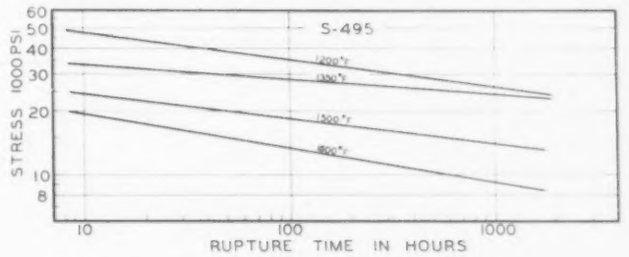


FIG. 11 - Stress rupture curves for alloy S-495 at various temperature levels.

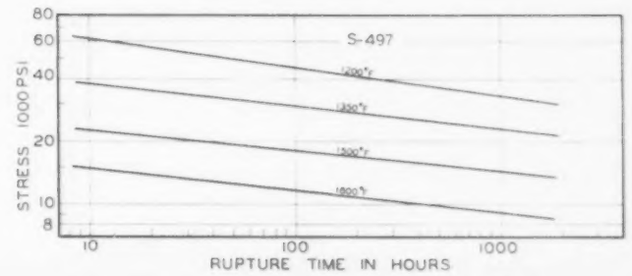


FIG. 12 - Stress rupture curves for alloy S-497 at various temperature levels.

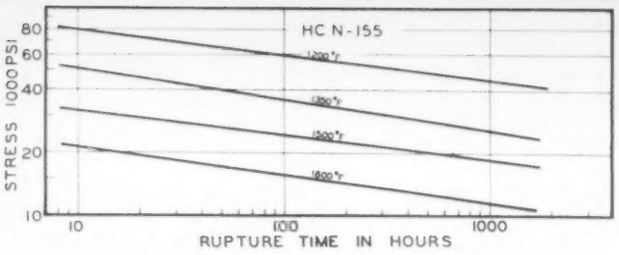


FIG. 1 - Stress rupture curves for alloy high carbon N-155 at various temperature levels.

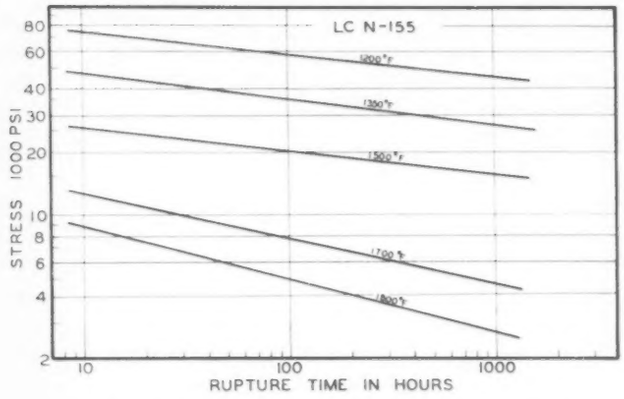


FIG. 2 - Stress rupture curves for alloy low carbon N-155 at various temperature levels.

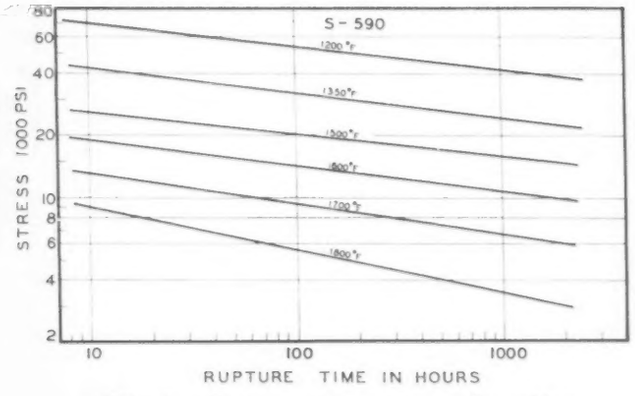


FIG. 3 - Stress rupture curves for alloy S-590 at various temperature levels.

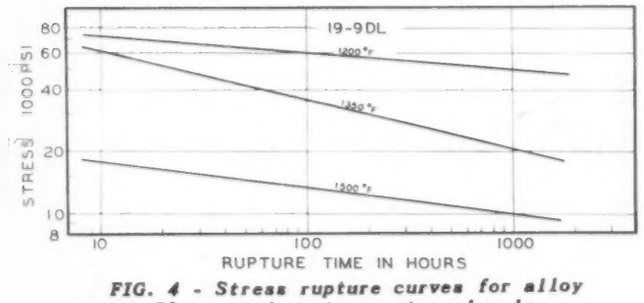
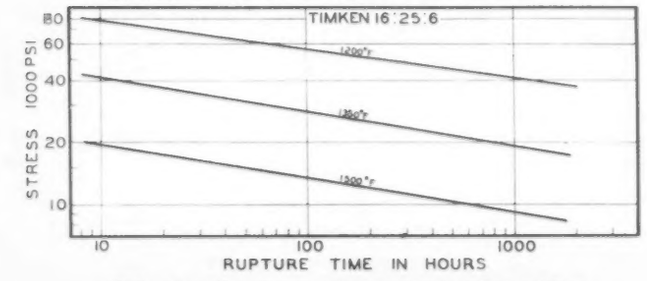


FIG. 4 - Stress rupture curves for alloy 19-9DL at various temperature levels.



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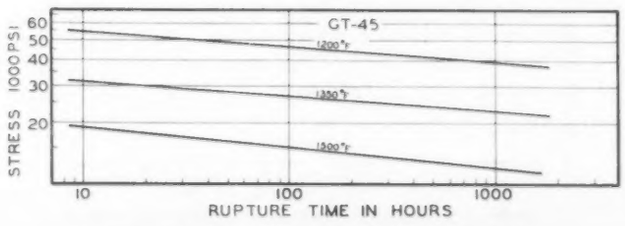

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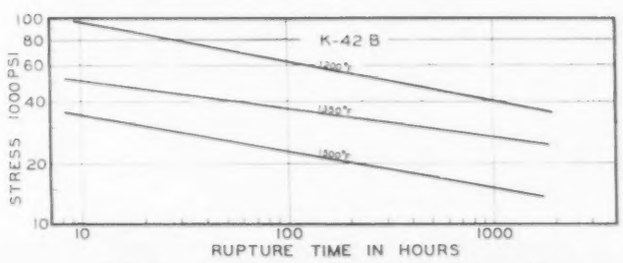

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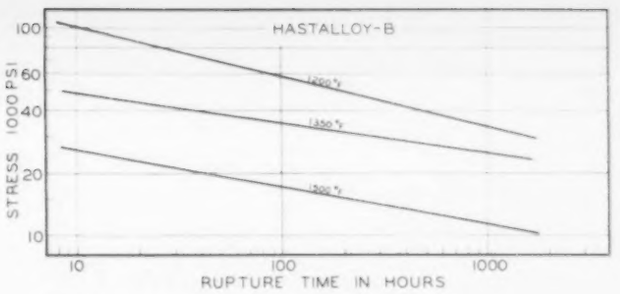

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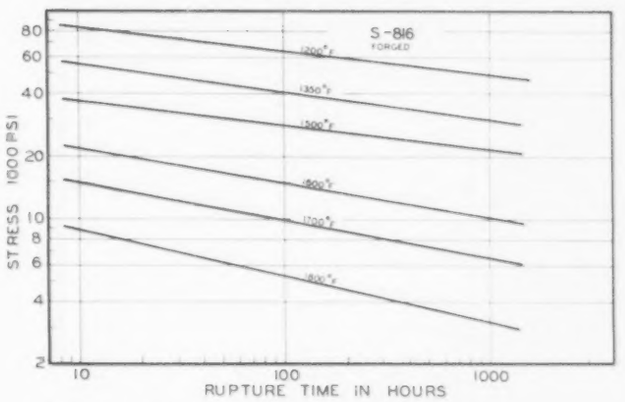


FIG. 9 - Stress rupture curves for alloy S-816 (forged) at various temperature levels.

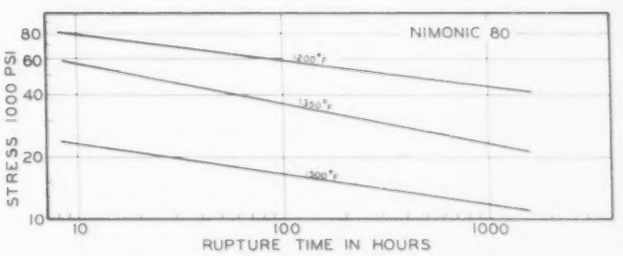


FIG. 10 - Stress rupture curves for alloy Nimonic 80 at various temperature levels.

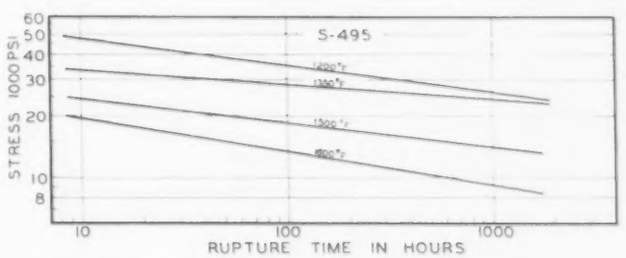


FIG. 11 - Stress rupture curves for alloy S-495 at various temperature levels.

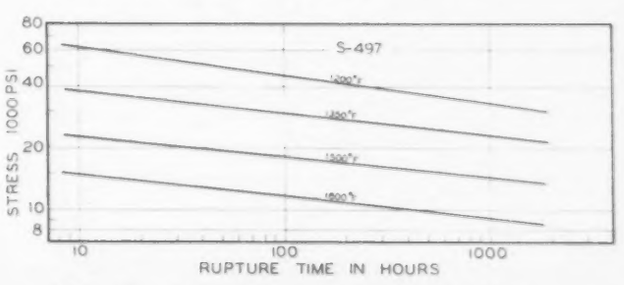
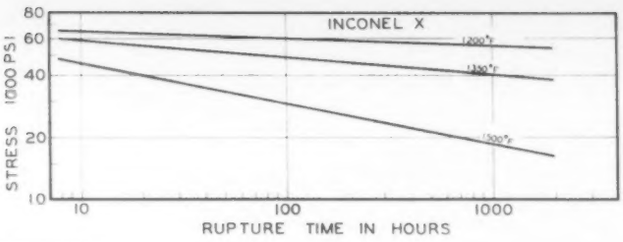
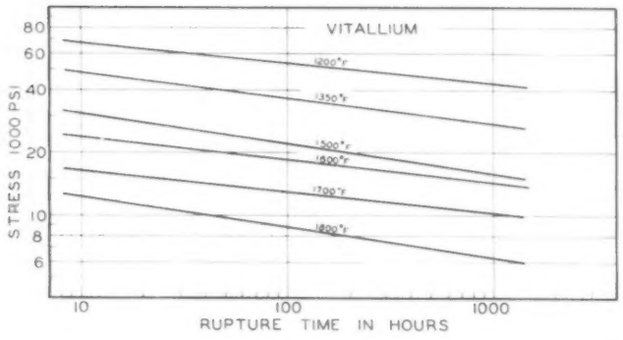


FIG. 12 - Stress rupture curves for alloy S-497 at various temperature levels.



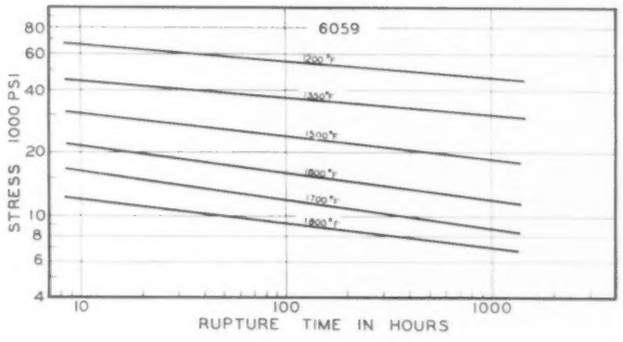
RIGHT

FIG. 13 - Stress rupture curves for alloy Inconel X at various temperature levels.



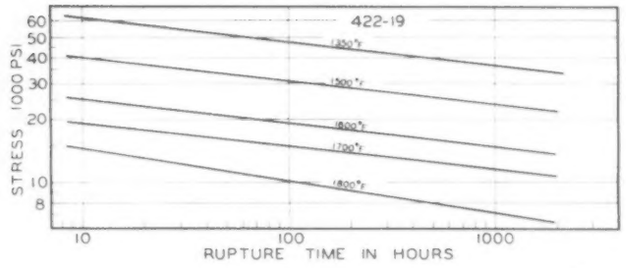
LEFT

FIG. 14 - Stress rupture curves for alloy Vitallium at various temperature levels.



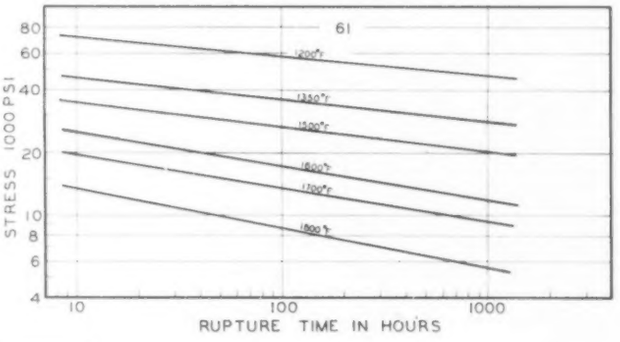
RIGHT

FIG. 15 - Stress rupture curves for alloy 6059 at various temperature levels.



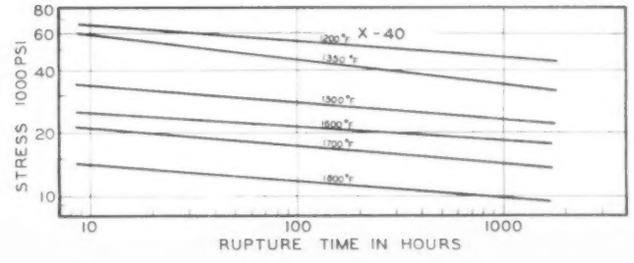
LEFT

FIG. 16 - Stress rupture curves for alloy 422-19 at various temperature levels.



RIGHT

FIG. 17 - Stress rupture curves for alloy 61 at various temperature levels.

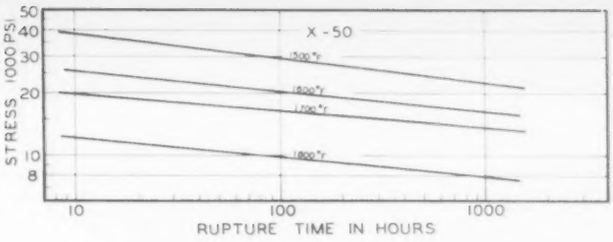


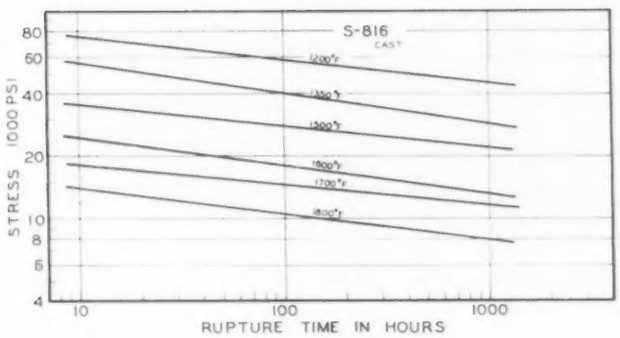
LEFT

FIG. 18 - Stress rupture curves for alloy X-40 at various temperature levels.

RIGHT

FIG. 19 - Stress rupture curves for alloy X-50 at various temperature levels.



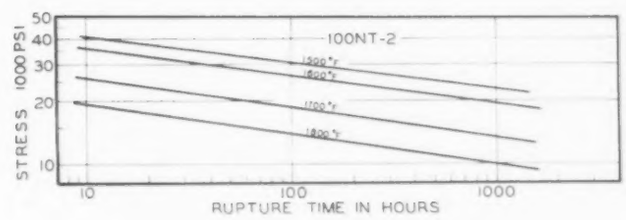


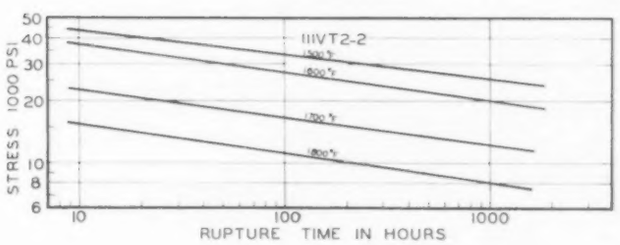
LEFT

FIG. 20 - Stress rupture curves for alloy S-816 (cast) at various temperature levels.

RIGHT

FIG. 21 - Stress rupture curves for alloy 100 NT-2 at various temperature levels.





LEFT

FIG. 22 - Stress rupture curves for alloy 111 VT2-2 at various temperature levels.

RIGHT

FIG. 23 - Stress rupture curves for alloy 73J at various temperature levels.

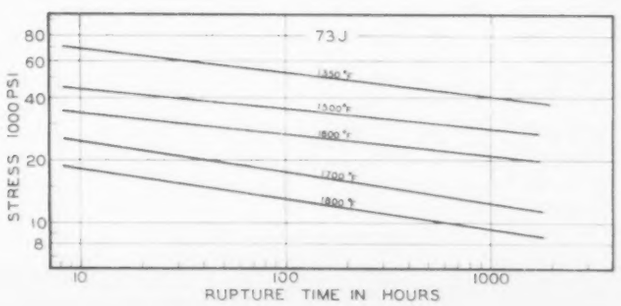


TABLE V Stress to Rupture and Elongation Values

FORGED ALLOYS

Trade Name	NR No.	Temp., °F	Stress to Rupture and Elongation 10 Hr Psi	10 Hr Pct	100 Hr Psi	100 Hr Pct	1000 Hr Psi	1000 Hr Pct	Treatment
HC N-155	21	1200	79,000	—	60,000	—	45,500	—	Forged 2075-1600°F. 2100°F—1 hr—AC; Finish rolled 1700°F; stress relieved 1200°F—AC
		1350	51,000	18	36,000	10	26,000	8	2320°F WQ; aged 50 hr—1500°F
		1500	32,000	12	24,500	10	18,600	4	2320°F—1 hr—WQ; 1500°F—4 hr—AC
		1600	21,300*	17	15,500*	7	11,400*	3	As hot worked + 1 hr 2300°F WQ; 1500°F —4 hr—AC
LC N-155	66	1200	75,000	15	59,000	15	46,000	13	Hot worked
		1350	47,000	—	36,000	15	27,000	11	Hot worked
		1500	25,800	26	20,000	28	15,800	—	2320°F—1 hr—WQ; 1500°F—4 hr—AC
		1700	12,500	50	7,600	19	4,700	7	2280°F—½ hr—AC
		1800	8,700	20-26	4,900	11	2,750	5.5	2280°F—½ hr—AC
S-590	74	1200	69,000*	33	52,000	35	40,000	37	2325°F—1 hr—WQ; 1400°F—16 hr—AC
		1350	42,000	28	31,500	24	23,500	19	2300°F—1 hr—WQ; 1400°F—10 hr—AC
		1500	25,500	16-20	20,000	16-20	15,500	8-12	2250-2325°F, 1-2 hr—WQ; 1500°F, 16-50 hr —AC
		1600	19,000	40-48	14,000	28	10,500	20-21	2300°F—1 hr—WQ; 1600°F—16 hr—AC
		1700	13,000	60	9,200	32	6,500	13	2270°F—1 hr—WQ; 1700°F—16 hr
		1800	9,000	56	5,500	28	3,400	—	2270°F—1 hr—WQ; 1800°F—16 hr
19-9DL	46	1200	70,000	7.0	60,000	4.3	50,000	2.5	Forged 2055°-1300°F; 2100°F—1 hr—AC
		1350	60,000	4.0	35,000	4.0	20,500	4.0	Rolled 1200°F; stress relieved 1200°F—AC
		1500	17,500	5.0	13,300	4.0	10,000	3.0	2250°F—½ hr—OQ; 1500°F—50 hr
Timken 16:25:6	15,49	1200	78,000	12	57,000	8.5	42,000	4.3	Forged 2065-1650°F; 2100°F—1 hr—AC
		1350	42,000	8.5	28,000	4	19,000	1.8	Rolled 1200°F; stress relieved 1200°F—AC
		1500	19,500	60	13,300	35	9,000	20	Preheat 1550°-2150°F WQ
GT-45	—	1200	55,000*	16	46,100	14	39,000	9	2250°F—½ hr—WQ; 1200°F—5 hr—WQ
		1350	32,000*	20-30	27,000	17	22,400	7.5	2250°F—½ hr—WQ; 1200°F—5 hr—WQ
		1500	19,000*	—	15,000*	—	12,000*	5	2250°F—½ hr—WQ; 1200°F—5 hr—WQ
K-42-B	77	1200	95,000*	1	62,000	1	39,500	0.5	1950°F—WQ; 1350°F—20 hr
		1350	49,500	1	36,500	1	26,500	1	1950°F—WQ; 1350°F—20 hr
		1500	33,800	2.5	22,500	2.5	15,000	2.5	2100°F—WQ or OQ; 1500°F—20-50 hr
Hastelloy B	94	1200	100,000*	2.1	58,000	2.2	33,200	8.5	2000°F—1 hr—WQ; 1200°F—4 hr—FC
		1350	48,000*	—	34,000*	22.5	25,000*	—	1950°F—2 hr—AC
		1500	25,600	28	17,000	59	11,300*	—	1900°F—24 hr—AC
		1600	16,700	—	11,700	—	8,300	—	Not known
S-816 (forged)	76	1200	83,000	14	64,000	8	49,200	4	2250-2300°F—1 hr—WQ; 1400°F—6-16 hr—AC
		1350	55,000	18	40,000	8	29,500	6	2300°F, WQ; 16 hr—1400°F
		1500	35,100	10	27,000	10	21,100	10	2300-2350°F—1 hr—WQ; 1500°F—16-50 hr
		1600	21,700	16	14,800	15	10,000	12	2300°F—1 hr—WQ; 1600°F—50 hr
		1700	14,900	15	9,800	6	6,400	—	2300°F—1 hr—WQ; 1700°F—16 hr
		1800	8,800	18	5,300	10	3,100	4	2300°F—1 hr—WQ; 1800°F—16 hr
Refractalloy 26	93	1200	—	—	74,000	—	—	—	Not known
		1350	—	—	48,000	—	—	—	Not known
		1500	47,000	20	29,000	18	18,000	16	2100°F—1 hr—OQ; 1500°F—20 hr—AC; 1350°F—20 hr—AC
Nimonic 80	29	1200	78,000*	3	60,000*	2.5	45,000*	1.8	1950°F—WQ; 1290°F—16 hr
		1350	56,500	1	36,000	1	23,300	1	1950°F—4 hr—WQ; 1400°F—50 hr
		1500	23,000	13	16,300	9.5	11,800	0.5	1950°F—4 hr—WQ; 1500°F—50 hr
S-495	8,34	1200	47,000	25	35,000	18	26,000	6	Forged 2200°F—AC; finish forged 1400°F
		1350	33,000*	28	28,000*	20	24,000*	—	2250°F—2 hr—WQ; 1400°F—50 hr
		1500	24,000	30	18,300	27	14,200	21	2250°F-2400°F—2 hr—WQ; 1400-1500°F 16-50 hr
		1600	19,200	29	13,400	22	9,200	9	2250°F—2 hr—WQ; 1600°F—50 hr
S-497	2,45	1200	61,000	17	45,000	9	33,000	4	Forged 2200°F; finish forged 1400°F or 2000°F—1 hr—WQ; 1300°F—16 hr
		1350	37,500	23	29,000	26	23,000	—	2200-2250°F—12 hr—WQ; 1500°F—4-50 hr
		1500	22,500	28	18,000	19	14,300	12	2200-2250°F—12 hr—WQ; 1500°F—4-50 hr
		1600	14,800	23	11,500	15	9,000	1	2250°F—2 hr—WQ; 1600°F—50 hr
Inconel X	99	1200	64,000	1	59,000	1	55,000	1.5	2100°F—24 hr—AC; 1300°F 6-20 hr—AC
		1350	58,000	40-60	48,000	15-20	40,000	2	2100°F—24 hr—AC; 1300°F 6-20 hr—AC
		1500	45,000	25±5	29,000	11	18,500	2.6	2100°F—4-24 hr—AC; 1300°F—6-20 hr—AC

ature is the test temperature. Actually it has been shown that for these alloys, particularly those more highly alloyed than 19-9DL, 16-25-6 and other modified stainless types, the best aging temperature is from 1300° to 1500°F, regardless of the test temperature. In most instances 1350°F appears to yield maximum strength in the cobalt-chromium-molybdenum alloys[4].

Aging is more important in the lower carbon alloys, because with increasing carbon the carbide network becomes more and more nearly continuous or approaches that state; consequently, aging affects a relatively small cross-sectional area of the test bar and most of the strength is due to this strong carbide network. Accordingly, alloys such as 100NT-2 and 111VT-2 can be used in the as-cast unaged state[7].

Log-Log Rupture Curves from 1200° to 1800° F

Included in the group of figs. 1 through 23 are the log stress v. log rupture time curves for rupture times of 10 to 1000 hr, for temperatures from 1200° to 1800°F. These curves are obtained from table V. Table V in turn was formed by the following steps:

(1) Test data from all sources were grouped as completely as possible for each alloy.

(2) Test data for each particular treatment of the alloy were grouped and plotted as an individual curve at each temperature.

(3) The average curve was selected for the particular treatment which produced the highest level of values at each temperature. Curves with only two or three points were not considered where more abundant data were available, because reproducibility of results is important. Heat treatments and aging treatments were considered in the selection of representative curves on the basis of knowledge of the alloy behavior. Care was exercised to list the exact heat treatments in table V for each set of values.

(4) Elongation values from tests which yielded the rupture curve were plotted using elongation and rupture time as the coordinates. Average values of elongation were then selected for 10, 100, and 1000-hr rupture times. Fairly wide scatter was often noted among the elongation points. In such cases the average values selected in table V are not too reliable; however, they are the best that the data indicated.

In a subsequent issue, the authors will evaluate the physical property data of the forged and cast alloys. — Ed.

for 10, 100, and 1000 Hr for Temperatures from 1200° to 1800°F

Trade Name	NR No.	Temp., °F	Stress to Rupture and Elongation 10 Hr Psi	Pct	100 Hr Psi	Pct	1000 Hr Psi	Pct	Treatment
CAST ALLOYS									
Vitallium	10	1200	68,000	—	54,000	—	43,000	—	As cast
		1350	48,000	—	36,500	—	28,000	—	Aged 50 hr—1500°F
		1500	31,000	15	22,000	10	16,000	5	Aged 50 hr—1350-1500°F
		1600	23,800	34	18,400	18	14,500	11	Aged 50 hr—1500°F
		1700	16,400	38	13,100	10	10,500	5	As cast
		1800	12,200	42	8,800	13	6,400	3	As cast
6C59	63	1200	66,000	—	55,000	—	46,000	—	Not known
		1350	44,200	16	36,400	18	30,000	27	Aged 50 hr—1500°F
		1500	30,500	23	24,000	22	18,800	15	Aged 50 hr—1500°F
		1600	21,400	36	16,000	25	12,000	11	Aged 50 hr—1600°F
		1700	16,200	29	12,000	16	8,600	10	As cast
		1800	12,000	27	9,200	14	7,000	8	As cast
422-19	12	1350	60,800*	30	47,000	23	36,300	11.5	Aged 50 hr—1500°F
		1500	39,500	38-44	30,400	23	23,500	6.6	Aged 50 hr—1350°F
		1600	25,000	22-26	19,000	6	14,700	0.5-1	Aged 50 hr—1600°F
		1700	19,000	14	14,700	7	11,500	5	As cast
		1800	14,400	27	10,100	18	7,100	2	As cast
61	60	1200	71,000	—	58,000	—	47,000	—	Not known
		1350	46,000	6	35,200	5	27,000	5	Aged 50 hr—1500°F
		1500	34,800	8	26,700	4.8	20,500	2.9	Aged 50 hr—1500°F
		1600	25,100	10-15	17,100	5.5	11,800	2.5	Aged 50 hr—1600°F
		1700	19,600*	30	13,500*	7	9,400*	5	As cast
		1800	13,500	20	8,700	12	5,600	5	As cast
X-40	71	1200	66,000	—	55,000	—	46,000	—	Not known
		1350	59,000	20	44,800	31	34,000	37	Aged 50 hr—1350°F
		1500	34,000	30	28,000	12	23,200	7	Aged 50 hr—1350-1500°F
		1600	25,000	36	21,300	19	18,500	7.5	Aged 50 hr—1600°F
		1700	21,000	39	17,300	22	14,400	16	As cast
		1800	13,300	46	11,300	24	9,800	8	As cast
X-50	72	1500	38,400	28	29,200	14.5	22,500	5	Aged 50 hr—1500°F
		1600	25,400	24	20,100	17	16,200	10	Aged 50 hr—1600°F
		1700	19,700	27	16,300	16	13,800	2	As cast
		1800	12,200	30	9,700	15	7,800	8	As cast
S-816 (Cast)	76	1200	72,000	—	58,000	—	46,000	—	As cast
		1350	54,000	—	40,000	16	29,000	—	As cast
		1500	35,500	15	28,500	3	22,000	1	2300°F—1 hr—WQ; aged 16-50 hr—1350-1500°F
		1600	24,500	19	18,000	17	13,000*	11	As cast
		1700	18,000	7	14,800	6	12,000*	2*	As cast
		1800	14,000	16	10,500	10	8,000	6	As cast
Co-Cr Base (9 W)	88	1500	42,600	—	32,000	—	24,200	—	Aged 50 hr—1350°F
Co-Cr-Ni Base (5 W, 5 Mo)	90	1350	49,000	28	42,000	21	35,000	12	Aged 50 hr—1350°F
		1500	35,500	9	28,500	5	23,000	2	Aged 50 hr—1350°F
MIT 31V4		1500	36,000	7	26,500	4	19,500	3	Aged 48 hr—1350°F
MIT 100NT-2		1500	40,500	8	30,500	5	22,800	3	2260°F—½ hr—WQ
		1600	35,000	7	26,100	4	19,300	2	2260°F—½ hr—WQ
		1700	25,800	20	18,200	6	13,100	2	2260°F—½ hr—WQ
		1800	18,800	20	13,600	7	9,900	2.5	2260°F—½ hr—WQ
MIT 36VT2-3		1500	39,000	28	27,800	25	19,200	6	Aged 48 hr—1500°F
MIT 36J		1500	37,500	18	29,200	12	23,000	5	Aged 48 hr—1350°F
MIT 35H		1500	36,200	15	28,000	10	21,800	12	Aged 48 hr—1350°F
MIT 111VT2-2		1500	43,000	11	33,200	10	25,800	6	As cast
		1600	37,000	10	27,300	8	20,000	8	As cast
		1700	22,400	22	16,800	16	12,100	8	As cast
		1800	15,300	22	11,100	20	8,000	20	As cast
MIT 73J		1350	69,000	7	52,500	7	40,500	7	Aged 48 hr—1350°F
		1500	43,500	14	34,800	13	28,200	10	Aged 48 hr—1350°F
		1600	33,500	16	26,400	11	21,000	6	Aged 48 hr—1350°F
		1700	24,800	20	17,200	13	12,300	6	Aged 48 hr—1350°F
		1800	18,000	20	12,800	10	9,300	3	Aged 48 hr—1350°F
CM 469		1600	67,000	17	37,800	12.5	21,400	—	As cast
OTHER FORGED ALLOYS									
41T2	1	1500	17,500	2	11,500	1	7,700	1	2150°F—45 min—AC
H-418	3,44	1200	68,000	17.5	54,000	13	42,500	4.8	Forge 2000-2100°F; finish rolled 1350-1425°F
		1500	28,600	9	16,800	3	8,800	1	2250°F—10 min—AC
H-355	4	1500	25,000	16	13,800	4.8	7,600	4	2150°F—10 min—AC
H-439	6	1200	79,000	12.5	56,000	10.5	38,500	3.5	Forge 2000-2100°F; finish forge 1350-1425°F
		1500	27,500	36	16,000	24	9,500	3.5	Preheat 1600°F; 2000°F—5 min—AC
Gamma Columbium	9,33	1200	56,000*	—	40,000*	28	28,800*	20	Preheat ½ hr—1550°F; 2250°F—45 min—OQ; aged 50 hr—1500°F
		1500	23,500	26	16,000	23	11,200	9	Preheat ½ hr—1550°F; 2250°F—45 min OQ; aged 50 hr—1500°F
		1600	14,000	33	10,500	24	8,000	5	Preheat ½ hr—1550°F; 2250°F—45 min —OQ; aged 50 hr—1600°F
Refractalloy B	17	1500	19,500	29	13,000	16.8	8,700	4.5	2280°F—30 min—OQ; 50 hr—1500°F
N-153	19	1500	27,000	42	19,000	24	13,400	9	Preheat ½ hr—1550°F; 2200°F—30 min —OQ; 50 hr—1500°F
N-154	20	1500	18,000	30	15,800	30	13,900	30	(Five different heat treatments)
N-156	22	1500	23,300	12	17,400	7	12,800	2	2100°F—AC; 26.3 pct reduc. at 1700°F; stress relieved at 1200°F; ½ hr—1550°F; 2200°F—0.5-1 hr—OQ; 4-50 hr—1500°F
8658-2	37	1500	21,000	45	15,000	40	10,800	12	2250°F—30 min—OQ; 50 hr—1500°F
8658-1	43	1500	21,000	34	15,600	17	11,700	9	2250°F—30 min—OQ; 50 hr—1500°F
ATV-3	51,67	1350	29,000	7	18,000	3	11,300	—	2250°F—30 min—AC; 50 hr—1500°F
		1500	16,800	7	10,500	5.5	6,600	—	2250°F—30 min—AC; 50 hr—1500°F
N-153 (LC)	64	1200	61,000	—	53,500	—	47,200	—	Hot worked
		1350	38,000	—	29,000	—	22,000	—	Hot worked
N-153 (HC)	19	1500	25,500	—	19,000	36	14,500	—	2200°F—1 hr—WQ; 1500°F—4 hr—AC
TE	57	1500	25,300	17	18,000	17	13,000	17	2300°F—WQ
Refractalloy	62	1500	24,500	20	19,000	18	15,000	11	2350°F—4 hr—OQ; 1500°F—24 hr
		1600	16,000	38	12,500	14	9,600	6.4	2350°F—4 hr—OQ; 1500°F—24 hr
MT17		1500	27,300	15	19,800	12	14,500	6	2260°F—WQ; 1500°F—50 hr
CAST ALLOYS									
X-41	47	1600	22,500	—	19,500	—	17,000	—	Aged 50 hr—1600°F
Co-Cr-Ni (9 Mo)	87	1350	56,000	20	45,000	21	36,500	23	Aged 50 hr—1350°F
		1500	36,200	17.5	29,200	15	23,500	12	Aged 50 hr—1350°F
Co-Cr (9 Mo)	89	1500	38,200	—	28,200	—	21,000	—	Aged 50 hr—1350°F

*Estimated

Powder Metallurgy as Applied to

The manufacture of permanent magnets by powder metallurgy calls for special materials and techniques, since magnetic, as well as physical characteristics must be obtained. Various procedures for developing the necessary properties are given in this article, including precautions that must be observed in order to obtain optimum results. The author also indicates that several new magnetic materials, now in the development stage, possess many desirable characteristics that promise further broadening of the field of powder metallurgy in the magnet industry.

THE use of permanent magnets is by no means new and the production of magnets by powder metallurgy techniques has been well established for approximately 12 years.

In 1855, a 6 pct tungsten steel was developed for use as a permanent magnet material. Constant efforts were made to develop alloy steels having improved magnetic properties, and in 1931 the Mishima alloy of 25 pct Ni, 12 pct Al, and 63 pct Fe, was introduced. This alloy was replaced in 1934 with a superior material containing 12 pct Co, 17 pct Ni, 10 pct Al, 6 pct Cu and 55 pct Fe, (Alnico II).

These new materials differed from conventional magnet steels in several ways:

(1) They were not true steels; i.e., carbon was not responsible for their hardness and was actually considered detrimental to superior magnetic properties.

(2) The alloys were extremely hard and brittle in all stages of manufacture and could not be annealed to permit machining or fabricating operations. Finishing and sizing were possible only by grinding.

(3) The coercive force and maximum available energy were far greater than ever before attained in commercial magnet alloys.

Typical properties of the above alloys are listed in table I.

The tremendous advantages of the high coercive force of Alnico created a large demand for the alloy in a wide range of shapes and sizes. Cast magnets were readily made in the larger sizes but difficulties were encountered in manufacturing small magnets of various shapes. It was evident that new manufacturing methods were required in order to reduce the cost of small magnets to the point where they could be economically utilized. Production of these small magnets by powder metallurgy techniques was tried and a working

Permanent Magnets

By A. E. FRANKS
Plant Metallurgist,
The Indiana Steel Products Co.,
Chauncey, N. Y.

installation was in operation as early as 1936. The economies and advantages of the new process were soon apparent and the production of sintered magnets gradually increased in volume. Since that time constant progress has been made in improving techniques and developing other alloys suitable for this type of production.

Before the introduction of the Mishima material, a cast alloy having the following typical magnetic properties was developed; $B_r = 10{,}500$ gauss, $H_c = 250$ oersteds, B_dH_d (max) $= 1.1 \times 10^6$ gauss-oersteds. This material possessed far greater magnetic stability than the earlier magnet steels and was essentially free from room temperature aging. This was a particularly advantageous feature, since prior to the introduction of this alloy, magnets were stored for several months before use to insure that their magnetic properties would not change after installation in equipment.

The Alnico alloys were introduced soon after and commercial applications were so great that little effort was spent in further improvement of the Mishima alloy. Also, the advent of the second world war created shortages in foundry and steel mill facilities that curtailed further production of the alloy.

Although the Alnico materials could be readily substituted, the cost of retooling and redesigning existing equipment was prohibitive in many cases and a more similar substitute material was sought. Since adequate supplies of metal powders were available, a modified composition of the original alloy was developed that could be readily processed by powder metallurgy techniques with existing equipment. The magnetic properties of the sintered alloy — called Indalloy — closely parallelled those of the cast material and the magnets supplied were readily substituted for the original cast components. In many cases the sintered magnets resulted in reduced costs.

There are now approximately 12 distinct permanent magnet materials that can be manufactured by powder metallurgy techniques. The process common to most of them consists of pressing pure metal or alloy powders to the desired shape, sintering, and heat treating, to develop the required magnetic and physical characteristics. Magnetic properties are extremely sensitive to small variations in chemical analysis and microstructure. The production of sintered magnets must therefore be closely controlled in order to maintain consistent quality.

In nearly all cases the powders used are of the highest quality available and are closely checked for uniformity. All powder is checked for: (1) chemical analysis, (2) maximum particle size, (3) particle size distribution, (4) shape and hardness of particles, (5) flow characteristics, and (6) compression ratio. Pure metal powders usually range in composition from 99 to 99.99 pct pure.

For most applications the coarsest acceptable particles must pass through a 100-mesh screen. These particles have a maximum dimension of approximately 149 microns. Samples of powder are passed through a standard set of graded screens. The portion passing through each is

FIG. 1 - The permanent magnet components shown above and at the left have been fabricated from Alnico II powder; the three magnets at the right are Indalloy, Vectolite, and Indalloy, respectively.

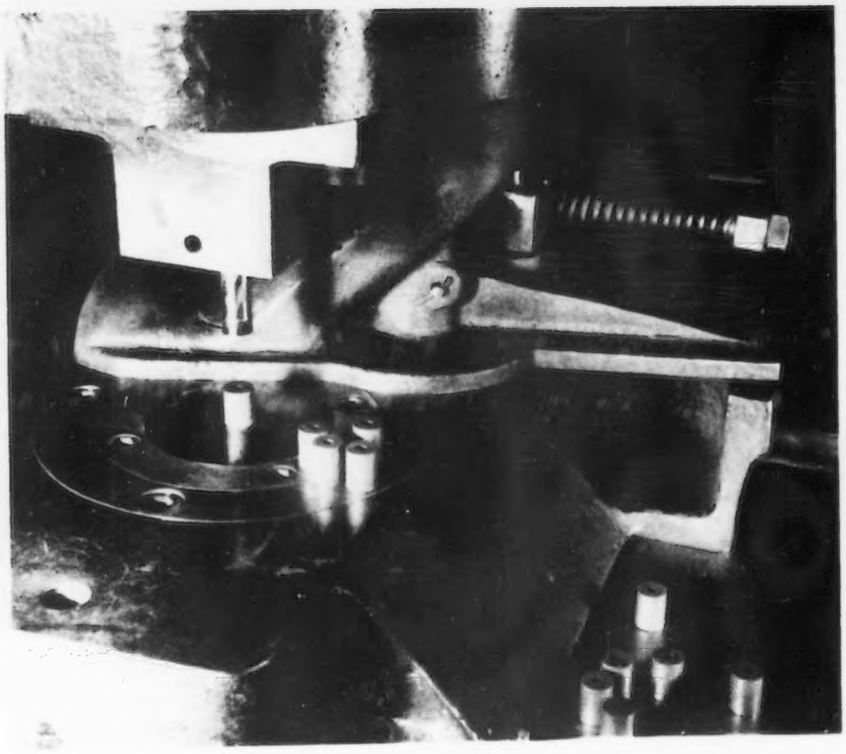


FIG. 2 - A double-acting press compacting cylindrical magnets containing cored holes.

weighed and the particle size distribution obtained. An example of a particle size distribution specification is as follows:

Mesh size	*Pct*
+100	Nil
−100 +200	0-10
−200 +325	5-15
−325	75-95

Certain special powders have been used that have a maximum particle size of 4 microns. In general, however, the use of these very fine powders does not offer sufficient improvement in product quality to justify the additional cost.

Soft spherical particles are considered to exhibit the best pressing characteristics.

Batches of magnet alloy powders are weighed out in the desired proportions and are thoroughly blended in ball mills. In order to improve the pressing characteristics of the mixed powders a small quantity of lubricant—usually a metal salt of a fatty acid or a hydrogenated oil—is added to the premixed powders and further mixing causes each particle of powder to be coated with a thin film of lubricant. These films reduce the friction between particles of the powder and between the powder and the die walls, resulting in a more uniform pressure distribution throughout the pressed parts. This decreases the tendency for nonuniform shrinkage during sintering and facilitates ejection of pressed parts from the die cavity.

Samples from each new batch of mixed powder are processed and tested magnetically before approving the powder for production. Approved powders are pressed into the desired shapes on automatic mechanical or hydraulic presses covering a wide range of sizes.

In some powder metallurgy applications the largest practical part that can be made is governed by the capacity of available presses. This is not generally true in the magnet industry, since most of the important sintered permanent magnet alloys are also produced by other manufacturing methods. In general, sintered magnets are advantageous only in small sizes, since large magnets can be produced more economically by standard foundry techniques. The magnets usually sintered range in weight from a fraction of a gram to approximately 60 g each. Some of the sintered alloyes exhibit more favorable physical properties than do the cast materials and where the physical requirements are unusually severe, large sintered parts are sometimes used even though the cost is greater than for a cast magnet of the same size. The rate of pressing on single die presses varies from 1000 to 2500 magnets per hr. Multiple die presses having as many as 24 die cavities are

TABLE I

Typical Properties of Various Permanent Magnetic Materials

Alloy	B_r, Gauss	H_c, Oersteds	B_dH_d Max, Gauss-Oersteds
6 pct tungsten steel	10,500	65	0.3×10^6
Mishima Alloy	7,000	500	1.4×10^6
Alnico II	7,300	560	1.7×10^6

available for extremely large quantity orders.

Rectangular magnets are usually pressed in the direction of the smallest dimension; the minimum thickness usually considered practical is about 0.060 in. Cylindrical magnets are pressed axially. Since deep-die cavities of small cross-section are difficult to fill uniformly, small cylindrical magnets are generally practical only when the length is not more than three times the diameter. Hollow punches sliding on core pins are used in pressing magnets with one or more holes in them. These holes need not be in the center of the magnet, but must be parallel to the direction of pressing. The minimum dimension usually considered practical for cored holes is approximately 0.080 in.

When making magnets that are to be pressed on shafts, it is not always possible to hold the dimensions of the cored hole within the required tolerances for press fits. In these instances, the holes are often cored oversize and mild steel inserts are placed in them before sintering. Shrinkage of the magnet during sintering securely binds the insert in place. The hole is then readily drilled in the insert and, if necessary, reamed to the required size.

During sintering the pressed parts shrink several percent in all directions. The amount of shrinkage depends upon: (1) chemical composition, (2) dimensions of the part, (3) compacting pressure used in pressing, and (4) sintering time and temperature. These factors are considered and compensated for when designing the punches and dies. Table II shows the standard tolerances maintained on all sintered Alnico magnets; standard tolerances for the other sintered materials are very similar.

When closer tolerances are required on certain dimensions, additional finishing operations are required. Since most of the sintered magnet alloys are difficult to machine, finishing is usally done by grinding; typical operations include surface, ID, OD, and centerless grinding.

For certain applications, small magnet assemblies, consisting of a magnet attached to soft iron pole pieces, are required. In some cases composite parts consisting of separate layers of magnet alloy and soft iron powder can be pressed and sintered, while sometimes it is necessary to solder the required pole pieces on the magnet.

Finished magnets are inspected for size and magnetic quality and are shipped magnetized, unmagnetized, or magnetized and calibrated. The additional handling required for shipping magnetized pieces considerably increases the cost of the magnets, and usually it is more economical for the customer to purchase the magnets in the unmagnetized condition and magnetize them in his own plant, either before or after installation.

Although equipment for magnetizing large magnets is specialized and expensive, permanent magnet magnetizing assemblies capable of saturating the small sintered magnets are available at low cost and require no auxiliary equipment or electrical connections.

Several new magnetic materials now in the development stage possess many desirable characteristics that promise further broadening of the field of powder metallurgy in the magnet industry. It must be remembered, however, that the powder metallurgy techniques provide only a valuable adjunct to other methods of manufacture and that they will not replace them entirely.

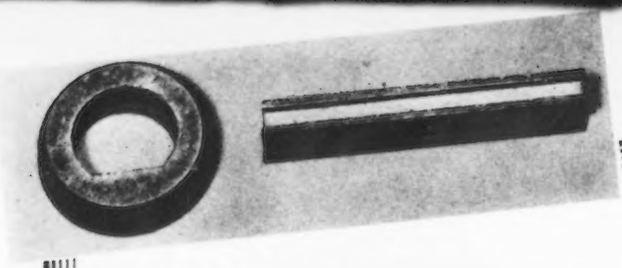
TABLE II
Standard Tolerances Maintained on Sintered Alnico Magnets

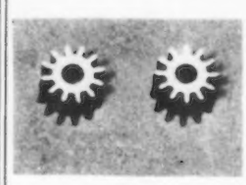
Dimension, In.	Tolerance, In.
Up to and incl. 0.125	±0.005
0.126–0.625	±0.010
0.626–1.250	±0.015
1.251–3.00	±0.031

Oil Pump Gears by Powder Metallurgy

The accompanying illustration shows a pair of automotive oil pump gears produced by powder metallurgy from an alloy containing about 93 pct Fe and 7 pct Cu. A briquetting pressure of 60,000 psi and a sintering temperature of 2050°F are employed, the sintering operation being performed in a non-oxidizing atmosphere. Advantages obtained by powder metallurgy processing of these parts are such that; a considerable amount of material is saved, machining operations are materially reduced, the contour of the teeth is maintained accurately and consistently, the gears exhibit satisfactory wearing qualities, and cost considerations are attractive. It is interesting to note that some users advise that powdered metal gears operate more quietly than gears manufactured by other methods. Data courtesy Moraine Products Div., General Motors Corp., Dayton

Powder





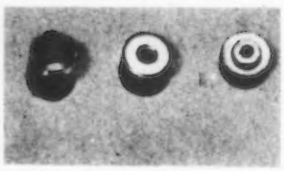
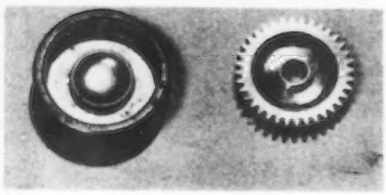
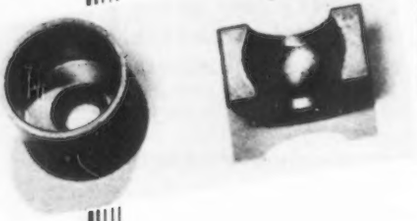
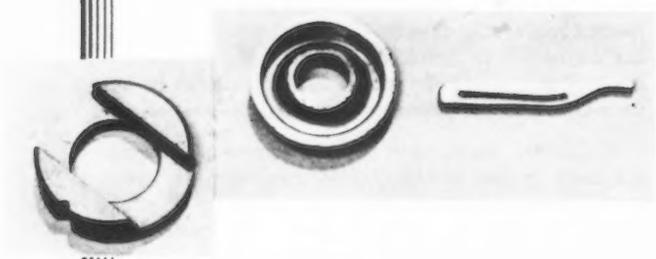


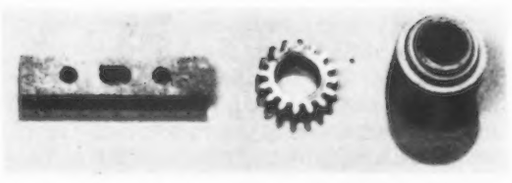
FIG. 1 - These brass metal powder parts, and the iron and bronze parts shown below and on facing page, can be produced with the low cost equipment described in this article.





The accompanying iron powder components can be produced in large quantities with equipment costing less than $5000.





By ROBERT TALMAGE

Powder Metallurgy Consultant, Norwalk, Conn.

FOR some manufacturers the powder metallurgy technique offers a solution to their constantly increasing cost problem. Concerns that use small parts in large volume, such as clock makers, have found that the process has low labor and material costs and quite often produces a more satisfactory product with an equipment cost that is considerably less than required for other production methods.

As an illustration of this, one manufacturer has found that he can produce a small gear (5/16 PD) at a cost savings of more than 50 pct with a total equipment cost of less than $3500. This low equipment cost is possible by using small, standard equipment designed for high speed production and low cost together with low labor content. Such equipment has limitations of shape and size but fig. 1 shows parts made from brass, bronze, and iron powders, that can be produced in large quantities with equipment costing less than $5000 total. From these groups it can be seen that a large variety of shapes, and sizes up to approximately 0.75 sq in. in cross-section and 1 in. long can be made. The equipment required is listed in Table I with the range of prices for each. The listed equipment does have limitations, which will be discussed later, but when used correctly, it can produce at high speed and low cost.

One of the major factors in the increasing efficiency of powder metallurgy is the relatively low powder cost, as a raw material, and its ability to produce a finished part without scrap loss. Copper powder at the present time is selling for 42 pct over base copper price, whereas prewar it was 63 pct. Good quality iron powder is now available at the same price or less than most gray iron castings, while brass powder is now approximately the same price as bar stock.

It is interesting to note that, because most powder producing plants are relatively small as

Metallurgy

Low Cost Equipment For Volume Production

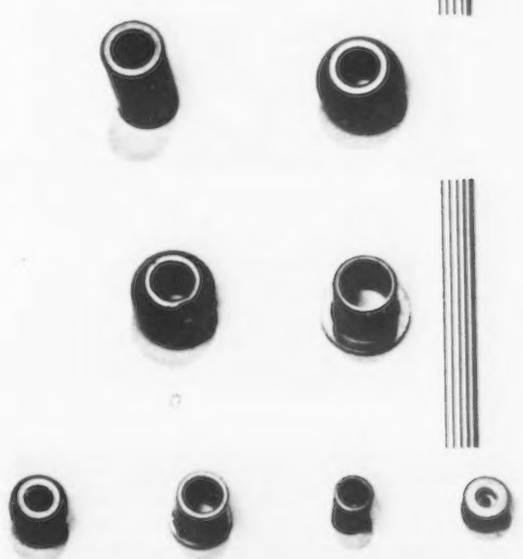
A potential method for combating rising material and labor costs is in the application of powder metallurgy techniques in the large scale production of small parts. Taking issue with the belief that original cost is high when setting up for metal powder processing, the author illustrates various components that can be accurately and rapidly manufactured with relatively inexpensive equipment. An interesting economic analysis is also presented whereby the costs of making a typical part in the screw machine and from metal powder are compared.

compared with other manufacturing industries, the price in the future will probably remain the same, or reduce as the usage increases. There are some low cost methods of powder production known, which require large tonnages for economical production, and hence are not being used today. Another factor, the elimination of machining or punching scrap, increases the advantage as material cost rises, because in many cases there is more than a 50 pct loss of material with other methods. The example in table II of the costs of a brass screw machine part, prewar and postwar, compared with powder metallurgy costs, serves to illustrate these points. Burden has not been considered in the calculations since this factor varies from plant to plant. Also direct labor costs have been considered equal for both the screw machine and powder metallurgy operations. This is not necessarily the case, because unskilled labor is often utilized for the metal powder operation; but, for the sake of focussing attention on material costs, the labor cost differential has been ignored.

The first operation in the production of parts is the mixing or blending of the various powders in order to distribute through them a quantity of dry powder lubricant, which serves to lubricate the die in pressing and assists in ejection, prevents seizure and reduces wear.

In mixing it is important to obtain a uniform dispersion of the various ingredients as well as of the different sized particles. Since automatic briquetting presses fill the die by volume only, uniform flow rate and powder density are highly important. Also, a uniform blend of alloying elements is important in sintering where a homogeneous alloy is required. Factors that affect blending are the relative size and distribution of the particles of each ingredient, their moisture content and the method and time of mixing. For performing this operation there are many types and sizes of specially designed dry powder mixers, most of which will do an excellent job. The usual materials, however, blend very well in a standard octagonal steel tumbling barrel, which is easily handled and cleaned and is usually fitted with a cover to prevent the release of the air-floating fines in the powders.

Parts fabricated from bronze powders (90 Cu - 10 Sn) that are also applicable to large scale production with an equipment investment of less than $5000.



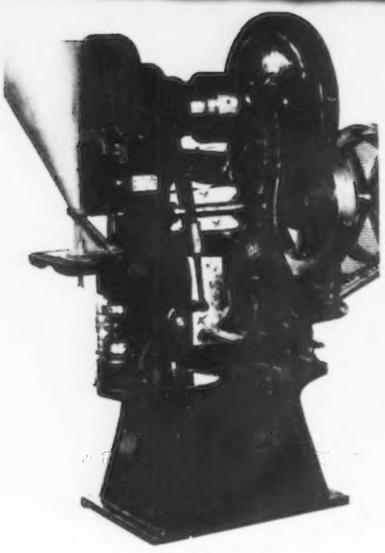


FIG. 2 - The figure shows a 20-ton variable speed press selling for less than $3000. Photo courtesy Arthur Colton Co.

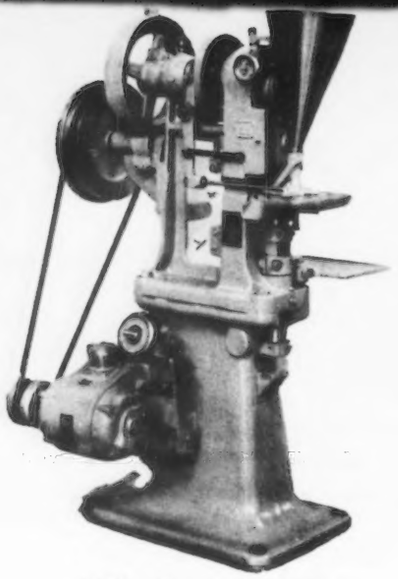


FIG. 3 - A 4-ton variable speed press selling for less than $1000. Photo courtesy F. J. Stokes Machine Co.

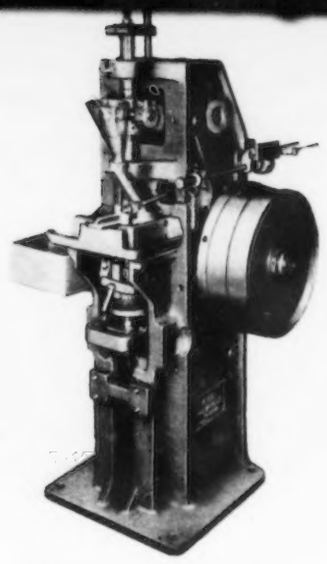


FIG. 4 - A 10-ton belt drive model selling for less than $2000. Photo courtesy Kux Machine Co.

Pressing or briquetting of the mixed powders involves (1) automatically filling the die with powder, (2) pressing it to the required density, and (3) ejecting the compact. This is accomplished best by special presses, although modified punch presses can be used. Many presses are used in other and older industries for pressing powders, such as pharmaceutical pill-forming (aspirin tablets), and such machines form the basic unit for metal-powder pressing also.

A pill press is a low cost machine and is available in sizes ranging from 2 to 20 tons, or more, at prices ranging from $500 to $3000 when equipped with a variable speed mechanism. Three such presses are shown in figs. 2, 3 and 4. These presses will not make all parts possible because they are only single action machines wherein all pressure is applied by the upper punch, the lower punch being used for ejection of the compact. When the proper materials are chosen and handled correctly and the tools are accurately designed and made, many parts usually considered dual pressure jobs (upper and lower punch both apply pressure in forming the compact) can be produced satisfactorily with single-action presses.

The more expensive dual pressure and multiple punch presses do offer advantages for some work, but where equipment investment is a prime factor, the plain presses can serve very well.

In figs. 5 and 6 are shown drawings of two sets of tools for the small 4-ton press shown. One is for the small electric clock motor bearing shown in fig. 7. This set of tools illustrates the four basic parts required to form a straight bushing; namely a die, two punches (upper and lower), and a pilot or core pin.

After a checkup to see that everything is working satisfactorily, the press is ready for adjusting and a trial briquette. The amount of fill or depth of cavity is adjusted by changing the bottom position of the lower punch, which is controlled by an adjustable nut on the lower punch holder.

For a start, the fill is adjusted to approximately 2½ times the length of compact and the adjusting nut is locked. The press is turned until the lower punch is at the top of its stroke and the other adjusting nut on the holder is adjusted, that is, until the top of the punch is flush with the die and pilot. The powder shoe is then placed on the table and with its actuating arm fastened, the shoe is filled with powder and the press is turned by hand until the upper punch is at its bottom position. The upper punch adjustment is then turned until the press is rather hard to turn, after which the cycle is completed and the briquette is ejected to the top of the die.

This briquette is usually quite fragile but sufficiently strong to handle and place on a small scale to weigh. If the weight is more or less than required, the fill-position nut is adjusted until the right weight is secured. The upper punch position is then adjusted until the correct length is secured after which all set screws and adjusting screws are tightened. The power is then turned on with the variable speed transmission set for slow, and several pieces can be made. These compacts are checked for weight and size and adjustments are again made, if necessary.

The optimum operating speed is determined by the ability of the powder to fill the cavity uniformly, each cycle. This is checked by observation and by weight. If uniform weight is not maintained, parts will be produced with varying density and this will cause variations in size and physical properties.

In fig. 5 notice that the countersink is formed by an extension on the upper punch. The other tool, fig. 6 shows the components used for forming the ratchet part shown in fig. 8. This set of tools indicates how single action presses can do double action work. In this case the core rod is spring-mounted and its motion controlled so that the amount of powder filled over the head portion is correct. As the upper punch compresses the powders, the pilot recedes against the spring to a

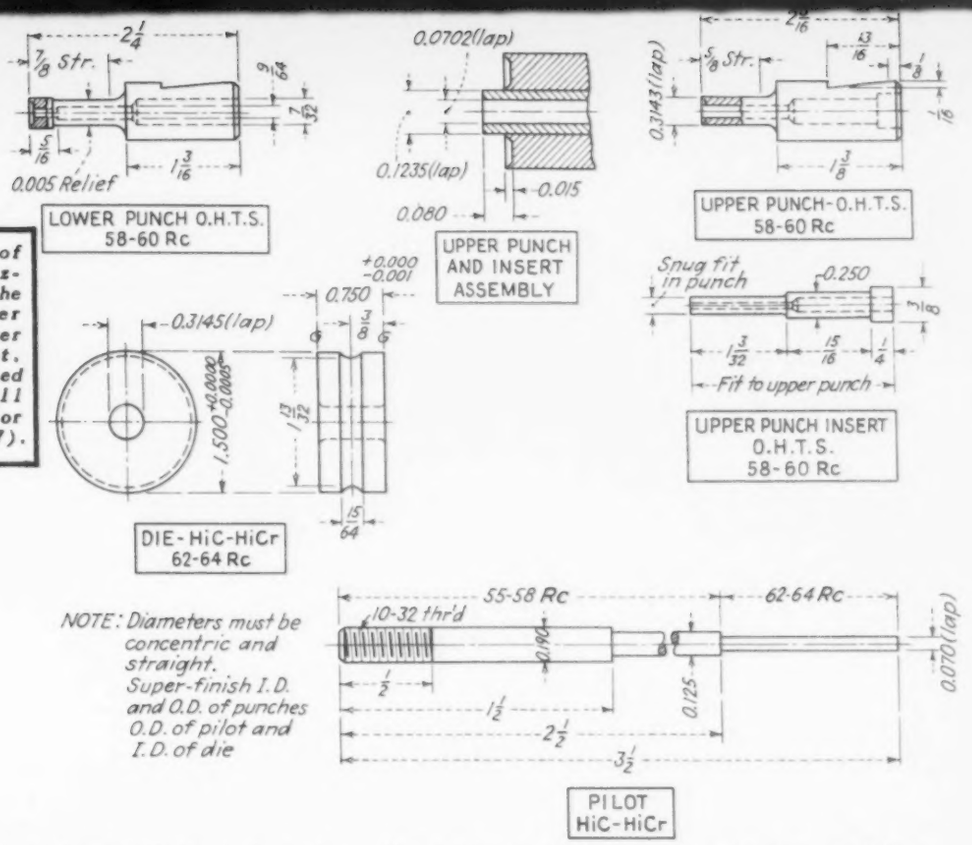


FIG. 5 - Drawings of briquetting and sizing tools showing the upper punch, upper punch insert, lower punch, die and pilot. These tools are used in producing small electric clock motor bearings (see fig. 7).

definite adjustable stop where both the body and head portion have been compressed sufficiently to obtain a good compact. Upon ejection the spring pushes the pilot back to its fill position.

The tools are a critical item for this work because tolerances are usually very close and finishes required are extreme. The fine surface finish is necessary in order to have the tools operate with close clearances without freezing. Any irregularities, such as grinding marks or lapping scratches, act to retain the very fine powders that drift down the clearances between the tools, in operation, and this retained powder gradually builds up and reduces the clearance until the lower punch is not operating with the freedom necessary for uniform production.

In order to protect the somewhat fragile briquetted parts from damage by too sharp a drop

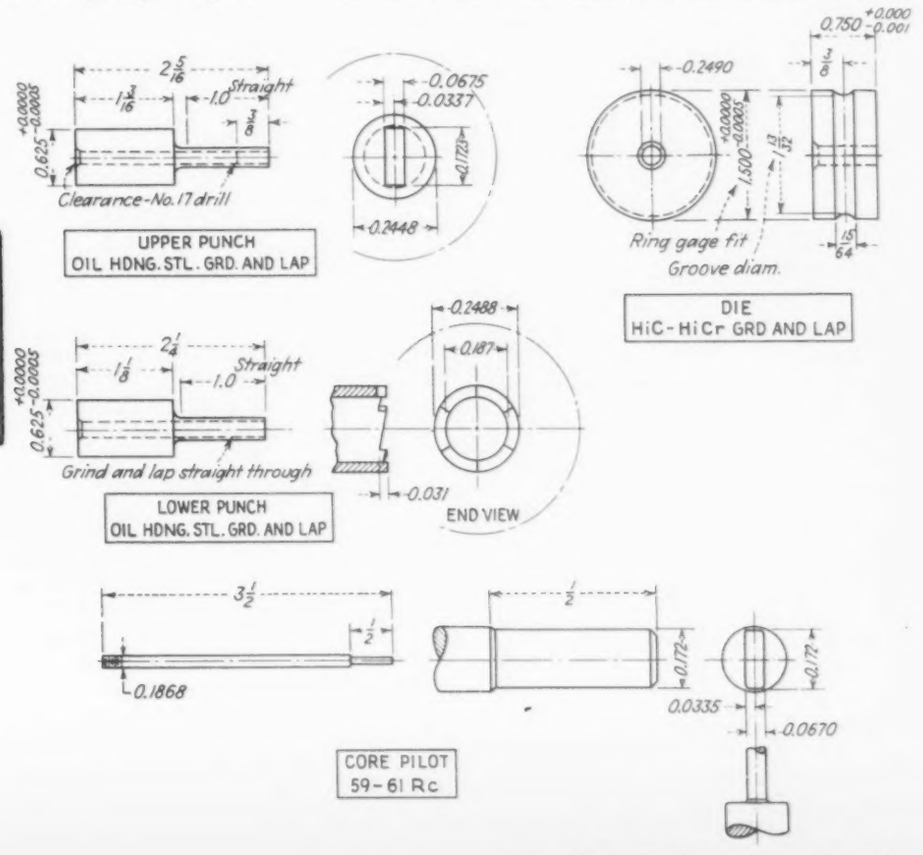


FIG. 6 - Drawings for the tools used in the production of a ratchet (see fig. 8) from metal powders. This set of tools indicates how single action presses can do double action work.

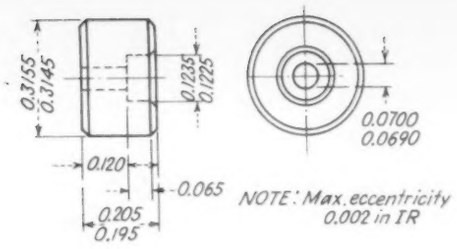


FIG. 7 - Drawing of an electric clock motor bearing made from 90-10 bronze powder. Part requires final sizing.

into a tote box or sintering tray, a special chute is usually fitted to the press. This chute is made either entirely or partly of perforated metal or screen wire so that the loose powder which is carried along by the compact will sift through into a pan provided underneath.

Speeds of operation of these presses will vary with the type of powder, atmosphere, and press used and with the shape of the part. Different powders have varying rates of flow which control the speed with which they can fill the die cavity. Powders with high flow rates fill faster and make possible operations at higher speeds. Particle size and shape and moisture content also influence flow rates. Atmosphere affects the speed because the powders are hygroscopic and high humidities cause them to slow down, and under extreme conditions, even to almost stop flowing. The shape of the part also limits the speed because it takes a longer time to fill a space 2 in. deep than one ¼ in. deep. Also, a part with 1/32 in. wall thickness is more difficult to fill than one with ⅛ in.

The other limitation is that of the press and that usually varies with the size. Rated speeds of single punch pill-presses range from 7200 parts per hr max for a 2-ton unit, to 3000 per hr max for a 20-ton model. Actual briquetting speeds may be as low as ⅓ of these values, however.

The briquetted pieces must be sintered to add strength and this is usually done in a controlled atmosphere full muffle type furnace. Small push-through models are available in either gas-fired or electric models at prices, including control equipment, of $1250 to $2000, examples of which are shown in figs. 9 and 10. These furnaces are capable of operating at 2100°F, continuously, and some will go higher. The sintering temperature for bronze is usually 1500°F; for brass, 1550° to 1675°F; and iron, about 2050°F. Time cycles will vary according to materials and properties desired but usually 15 min in the heating zone is a minimum, with 45 min ordinarily being a maximum for the usual production job.

TABLE I

Typical Equipment Costs*

	Min.	Max.
Bench scales for weighing powder	$150	$150
Tumbling barrel for mixing powders	300	500
Briquetting press (incl. drive)	500	3,000
Sintering furnace	1,100	2,000
Atmosphere generator	350	1,750
Total	$2 400	$7,400

* Does not include installation Charges.

The quantity of material that can be sintered with such furnaces will vary according to the sintering characteristics of the material. The type of furnaces illustrated has successfully produced 25 lb of work per hr.

The parts are sintered by first placing them in trays or baskets made of a heat resisting alloy. Quite often this can be done by merely gently piling the parts to uniform depth; however, sometimes it is necessary to uniformly space the parts one thickness deep in order to prevent deformation. It is important for uniformity to maintain the same tray loading and time cycle for each part once the standard has been established.

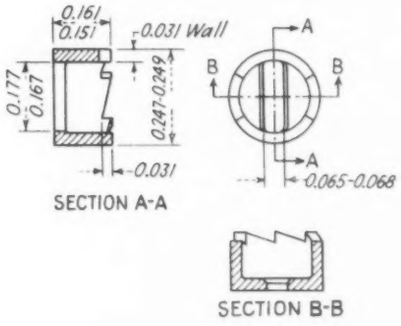


FIG. 8 - Drawing of a ratchet made from 70-30 brass powder. The part requires no final sizing.

Bottled hydrogen can be used for the controlled atmosphere, but since it is quite expensive, an atmosphere generator is usually installed. There are many types and sizes in this equipment and their cost ranges from about $325 for a 250 cu ft per hr gas-fired city or natural gas converter to about $1750 for a 100 cu ft per hr electrically-operated ammonia dissociator. Dissociated ammonia has proven satisfactory in service, but is quite expensive. It costs about one-third as much as bottled hydrogen, but about 10 times as much as converted gas. It is quite simple to operate, however, and when installed correctly, produces good clean work in bronze, brass, and iron parts with very little trouble or attention.

That covers the basic manufacturing equipment required for the production of metal powder parts, because in many cases, especially with brass and iron, sufficiently close tolerances can be held out of the sintering furnace. No flat rule can be laid down as to the tolerances that can be held because different materials, and pressing and sintering conditions, will affect the control possible. However, with uniform conditions of raw powders, mixing, briquetted density and sintering time and temperature, tolerances of 0.002 in. cross-section, and 0.005 in. of length can be held in iron parts.

Sometimes it is necessary to perform a second press operation in order to maintain closer tolerances (0.001 in. per in. or less on cross-section dimensions) and better finish, especially in the case of bronze bearings. This is usually done in punch presses with practically the same shape

and construction of tools used in briquetting, but they are mounted in a diet set. The materials are 10 to 25 pct porous and compressible, so the parts are sized in closed dies. The cross-section dimensions of the sizing die are the same as those required on the parts, but usually different from briquetted size, because of changes that take place in sintering. Iron powder mixes will vary in this respect, since some of them shrink as much as 2 pct under similar conditions, while others do not shrink, and may even expand. Brass usually shrinks, and bronze, when made from a mixture of tin and copper powders, usually grows. Besides the differences in materials, (1) briquetting pressure, (2) sintering temperature and (3) time, also effect the amount of size change.

In some cases it is possible to use the briquetting press and tools for sizing work also. This is particularly true of bronze bearings which grow in sintering. When used for this work the press is usually equipped with single cycle control so that it can be stopped for removal and replacement of parts when the press is not in operation. Sometimes, however, the press is run continuously at a slow enough speed for the operator to remove the sized part and place the new one. The small bear-

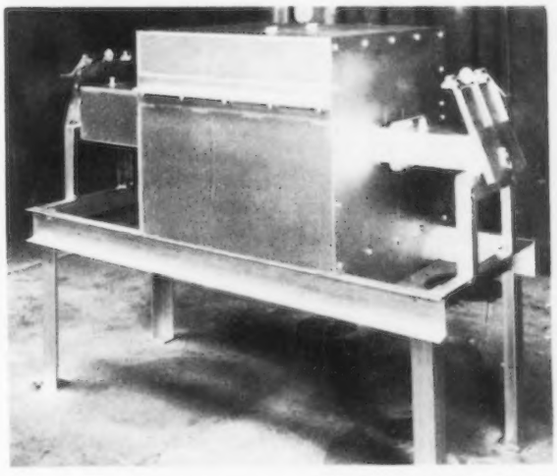


FIG. 9 - An electric sintering furnace selling for less than $2000 complete with controls. Photo courtesy Hevi Duty Corp.

ing tools illustrated have been used for both briquetting and sizing on the press shown with considerable success. Also it is possible to fit an automatic feed, for sizing purposes, to these presses. Speeds of the sizing operation will vary from an average of 800 parts per hr, for start-stop operation, to 1200 parts per hr from continuous operation. Automatic sizing will vary according to the press and part but speeds as high as 8000 parts per hr have been attained.

Specialized equipment for producing more complicated shapes, and/or larger sizes, at higher production rates is available at considerably higher prices. Press costs range up to $50,000 for an automatic 350-ton machine having a maximum speed of 18 parts per min. Furnace costs range to almost the same figure for equipment having a capacity of approximately 300 lb per hr with conveyer, three separately controlled heating zones, straight line recording temperature controls, etc.

It is the author's hope that, while many details have been left out, this description will serve to illustrate the relatively simple technique involved and point the way toward increased usage of the powder metallurgy process.

TABLE II

Comparison of costs (per 1000 pieces) of screw machine v. powder metallurgy for a brass bushing 0.560 OD x 0.345 ID x 0.400 in. overall length with 0.450 x 0.115 in hub one end.*

Screw Machine		
Gross material weight, lb.		37.3
Finished weight, lb.		14.5
Machine scrap weight, lb.		22.8
Direct labor, hr.		0.15
Costs Jan. 1941		
Gross material @ 15.01¢ per lb.	$5.60	
Scrap allowance @ 8.875¢ per lb.	2.02	
Net Material cost		3.58
Direct labor @ $1.00 per hr.		0.15
Total		$3.73
Costs Jan. 1948		
Gross material @ 24.69¢ per lb.	$9.21	
Scrap allowance @ 14.75¢ per lb.	3.36	
Net material cost		5.85
Direct labor @ $1.50 per hr.		0.225
Total		$6.075
Powder Metallurgy		
Net weight, lb. (no scrap and lower density)		13.00
Direct labor, hr.		0.20
Costs Jan. 1941		
Material @ 21.5¢ per lb.		$2.80
Direct labor @ $1.00		0.20
Total		$3.00
Costs Jan. 1948		
Material @ 25¢ per lb.		$3.38
Direct labor @ $1.50		0.30
Total		$3.68
Cost savings by Powder Metallurgy		
1941 total		$0.73 — 19.5 pct
1941 material		0.78 — 22 pct
1948 total		2.40 — 39.5 pct
1948 material		2.47 — 42 pct

* The powder metallurgy cost data used indicate the economies arising from the use of metal powders; however, the data were not obtained from operations conducted with low cost equipment such as described in this article. The equipment was of a more specialized nature. The screw machine costs represent actual operating costs as experienced by a manufacturer.

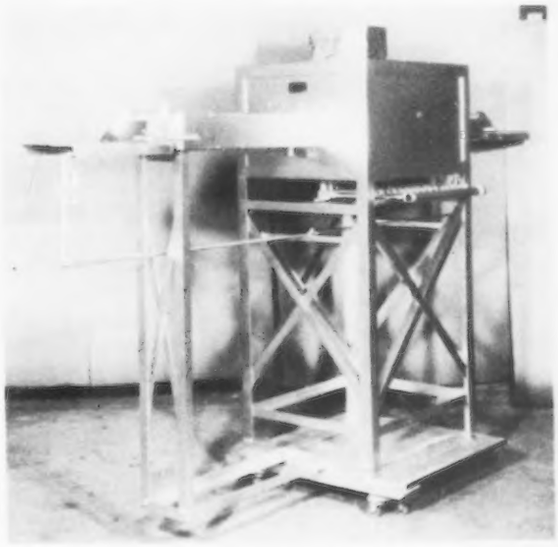


FIG. 10 - A gas-fired sintering furnace selling for less than $1500 with controls. Photo courtesy Chas. A. Hones Corp.

Sponge Iron and Iron Powder

By J. F. DRAPEAU
Metallurgist,
Metals Refining Div.,
The Glidden Co.,
Hammond, Indiana

Competition from European sources once again challenges the American iron powder producing industry, and creates a need for improvements in powder quality and characteristics. An interesting installation, a continuous sponge iron-iron powder setup, for converting iron scale to high quality annealed and unannealed iron powders is described in this article. Plans for the introduction of new and improved ferrous powders manufactured by procedures not previously employed in the industry, are also announced by the author.

BEFORE the war, most of the iron powder used in this country came from Europe as a select grade of powdered sponge iron. When World War II broke out this European source of iron powder was lost and American consumers who had just started in developing the technique of fabrication with iron powder looked to American metal powder producers to take care of the requirements. Not only did American producers supply all that was asked for, but iron powder of improved quality for powder metallurgical operations was supplied.

European sources are again coming into the market to compete with the young American industry. It is likely that competition in the next few years will tell how many American producers can survive. Today, the metal powder fabricators find themselves in an excellent position for supplies of iron powder of various types and grades, the supply appearing over-adequate for immediate demand. What the American powder producers look for now is a broadened use for iron powder.

At the time European supplies were cut off, Metals Refining Co. had completed a new process for the manufacture of reduced iron powder that was successful in producing the requisite tonnage of sponge iron at a 97 pct Fe content. In the initial operation of the sponge iron furnace, numerous mechanical problems were encountered and overcome, and a successful and continuous sponge iron—iron powder setup was effected and subsequently operated.

Fig. 1 shows a transverse cross-section of the furnace. The upper sketch indicates the radiant tubes for indirect heating, the construction of the roof, side walls, bottom of the furnace, and the intermittent rabbling device. The lower figure shows a cross-section of return chamber with a sealed-in rabbiing device. Fig. 2 shows a longitudinal cross-section of the furnace, showing diagrammatically, the feeding device, the rabbling device, discharging means and other details relative to the furnace construction. Fig. 3 is an actual photograph of the sponge iron furnace. This

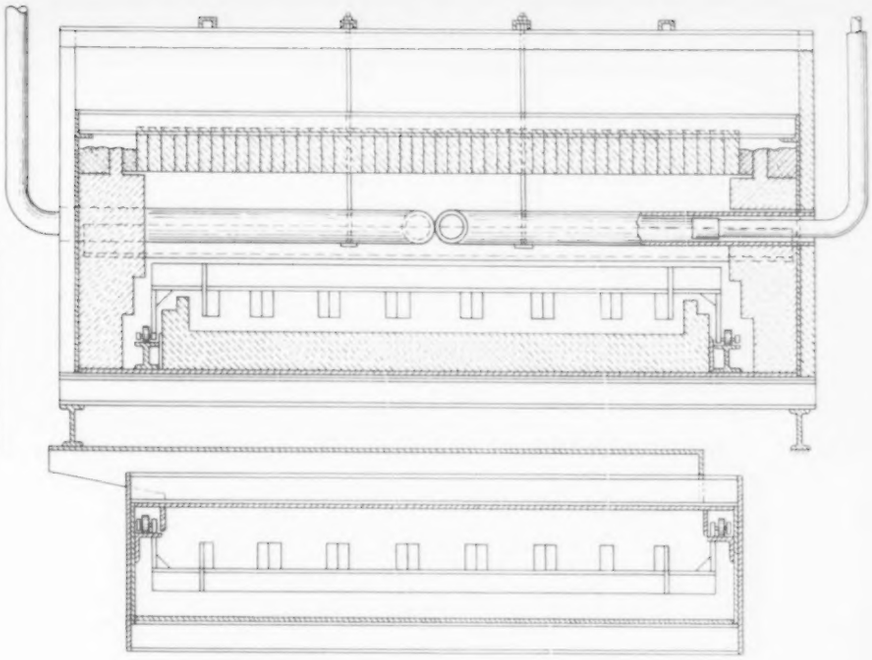


FIG. 1 - Transverse, cross-section view of a sponge iron furnace used in converting iron scale to annealed and unannealed grades of iron powder.

photograph shows a longitudinal view of the furnace from the charging end.

Natural gas, the fuel employed in heating, is premixed with air for complete combustion, in high temperature, heat-resisting alloy (nickel-chromium) tubes. Prepared classified mill scale, which meets rigid specifications, serves as a feed for the sponge iron furnace. As it is advanced through the furnace by the intermittent rabbling device, it is converted to sponged iron. The furnace is operated at a temperature of about 1800°F.

Sponge iron comes from the furnace in small agglomerates or lumps. The agglomerates are discharged directly from the furnace into a cooling conveyor, which discharges directly to the mill for converting sponge to a powder. The iron powder coming from the mill is fed directly to magnetic separators, to eliminate nonmagnetic material, and is then passed through air classifiers. Oversize powder, leaving the air separators, is screened to separate the powder into various sieve sizes for packaging and marketing as an unannealed iron powder.

Shortly after Metals Refining entered into the production of iron powder, end users expressed a preference for certain improvements in pressing characteristics. An unique and effective process for annealing iron powder was developed, which improves the iron powder by subjecting it to mechanical deformation, thereby setting up internal stresses and strains in the individual particles. When the cold-worked powder is annealed under controlled conditions, for periods from a few minutes to several hours, the internal stresses, together with recrystallization phenomena, are found to develop important changes in the characteristics of the powder. This annealing treatment also improves the tensile strength and modulus of rupture of sintered iron compacts.

Segregation is a factor that cannot be overlooked when two or more fine particle size powders are blended, since it offers difficulty in obtaining uniform blends. The end user is also concerned, inasmuch as small particles tend to float away or segregate from the coarser particles in his handling of powders. Through research, methods for the treatment of powder during manufacture were developed, which eliminated the segregating tendency.

Increased demand for annealed iron powder has been the general trend among the end users. Non-segregating properties are particularly attractive to the end users who blend two or more fine powders. They have found that this segregation treatment enables them to produce much more uniform composition parts.

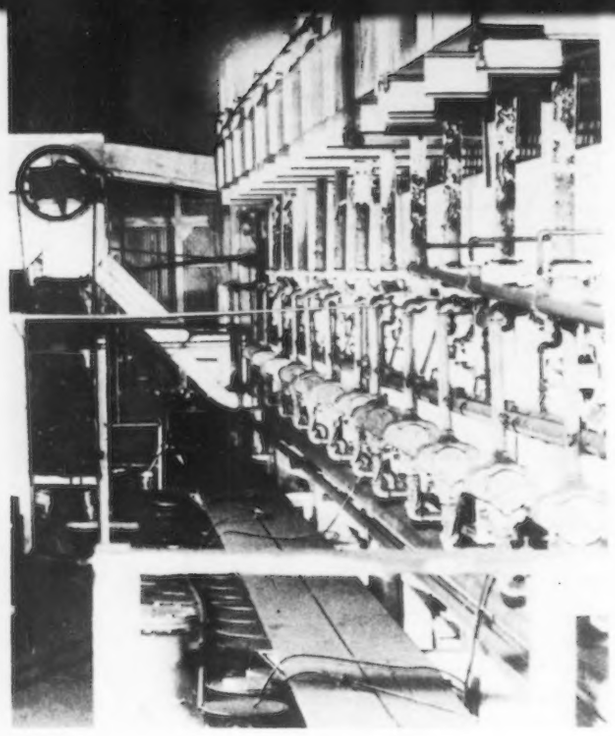
The flow sheet employed in the processing of iron scale to iron powder is given in table I.

TABLE I

Flow Sheet for Converting Iron Scale to Unannealed and Annealed Grades of Iron Powder

Iron Scale
↓
Reduction in Continuous Sponge Iron Furnace
↓
Cooling of Sponge Iron to Room Temperature
↓
Milling the Sponge to Powder
↓
Magnetic Separator to Remove Non-Magnetic Powder
↓
Air Classifier
↓
Screening or Grading of the Powder

Annealed Iron Powders	Unannealed Iron Powders
↓	↓
Annealing Treatment	Packing
↓	
Cooling	
↓	
Screening	
↓	
Packing	



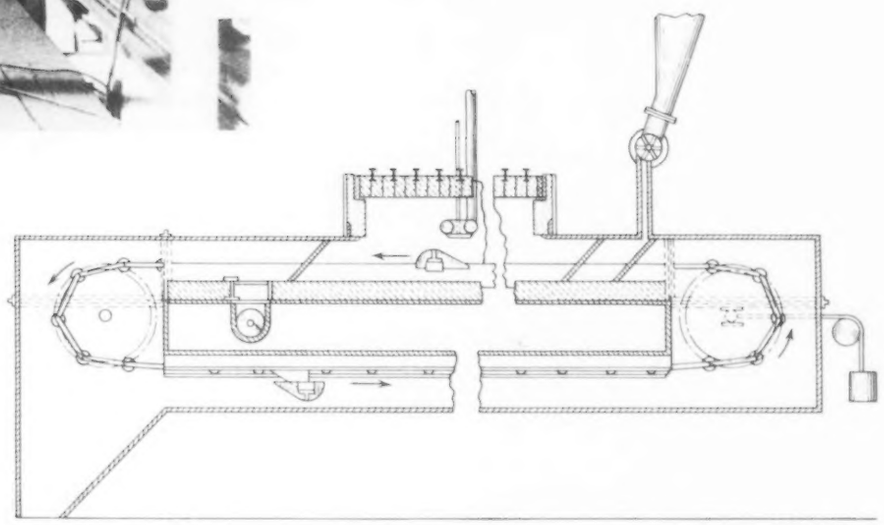
ABOVE

FIG. 3 - Longitudinal view of the sponge iron furnace from the charging end.

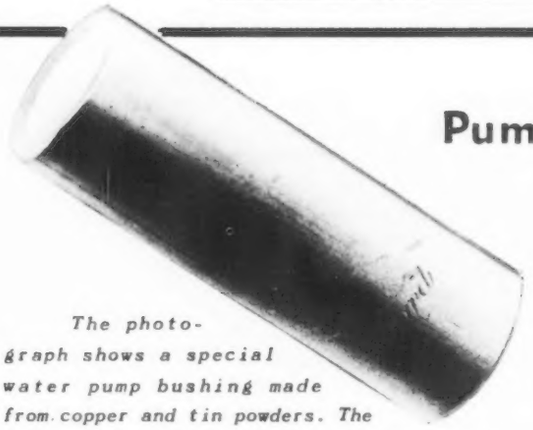
It is to be expected that in the next few years many novel treatments may be developed to improve the overall qualities of metal powders. The Metals Refining Co., for example, plans to introduce new and improved ferrous powders manufactured by procedures not previously employed in the industry. It is believed that these powders will meet the demands of uniform molding and sintering characteristics better than any product on the American market today. It is hoped that these powders through their improved quality and characteristics will enable the fabricating industry to expand the market and through tonnage processing reduce costs to the end users of fabricated parts.

BELOW

FIG. 2 - Longitudinal, cross-section view of the sponge iron furnace shown in fig. 1.



Pump Bushings by Powder Metallurgy



The photograph shows a special water pump bushing made from copper and tin powders. The bushing is 1.985 in. long, has an OD of 0.6895 in. and an ID of 0.5025 in. It weighs 1.402 oz and contains 20 pct oil by volume. The copper and tin powders are mixed with powdered graphite and other lubricants, then compressed at about 40 tons per sq in. The lubricants are added for the purpose of lubricating the compacting die. After the compacting, the part is sintered in an electrical furnace using a cracked propane atmosphere at apppoximately 1450°F for about 15 min. When the bushing has been sintered, it grows slightly in all directions, which necessitates a sizing or restriking operation. This sizing operation is accomplished using special dies which permit the insertion of the core rod before the part enters the die and keeps it in place until after the part leaves the die. This enables the part to be held to a concentricity of 0.001 in. Data courtesy Ford Motor Co., Dearborn, Mich.

New Equipment . . .

Drilling, two-way horizontal, and plain milling machines, hydraulic presses, an automatic end seamer, a mass spectrometer, a magnetic separator, a contour transfer gage, and electric motors are featured this week. An adjustable drillhead, ejector type cutting tools, a milling attachment, boiler feed pumps, tool lubricants and a tin stop-off coating material are also included in the review.

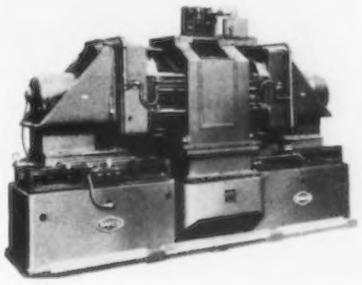
Drill

A RECENT development by *Moline Tool Co.*, Moline, Ill. is the HF148 drilling machine, the two-column model illustrated having individually controlled hydraul-

ic feed to each of the two spindles. The machine can be built as a single-column, single-spindle machine or as a multiple column, multiple-spindle model. The spindle is designed with capacity to drive a 1⅛-in. drill in mild steel. Electrical control of the hydraulic feed permits an independent, automatic operating cycle for each spindle which can be initiated by push button or foot - operated switch. Selector switches can be set so that either spindle will repeat the feed cycle continuously until stopped by operator. In the two-column model, both spindles can be run in alternate, continuously repeating cycles by means of electrical interlocking.

Horizontal Drilling Machine

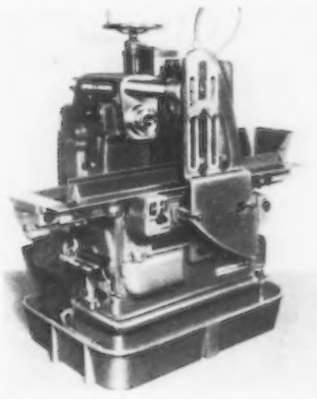
OF special floor-type construction, a two-way horizontal machine for high production machining of automobile connecting rods and caps has been developed by *Baker Bros. Inc.*, Toledo. The machine is furnished with a six-station trunion type power index



fixture arranged to clamp one connecting rod and cap at each station, and utilizes two Baker model 15x16 hydraulic feed saddle units. The right unit is equipped with a 20-spindle fixed center multiple head, assembled with a self contained lubricant pump, and driven by a 10-hp motor. The left unit drives a 12-spindle head, powered by a 7½-hp motor. The 15 x 16 unit has a high rate of rapid traverse and saddle feed, and may be mounted in horizontal, vertical or angular planes. Hydraulic power is provided for each saddle unit by a separate variable delivery portable pump-sump unit mounted on casters.

Plain Milling Machine

THE new, electrically controlled, 7½ hp spindle drive No. 12 plain milling machine announced by *Brown & Sharpe Mfg. Co.*, Providence 1, is specifically powered for heavy cuts, with ample capacity for many moderate-sized carbide milling jobs. Its power is applied through a separate spindle motor to give maximum effective cutting capacity and economy. A broad range of speeds and feeds is provided to best mill various materials and to permit the most efficient milling cycle. There are 21 spindle speeds from 25 to 1790 rpm in either direction plus 28 separate rates of feed from ½ to 35 ipm. Sixteen rates of table feed, ½ to 17½ ipm, can be automatically doubled at any desired point in the cutting feed, or 16 rates, 1 to 35 ipm, may be automatically halved. Automatic table reverse in cutting

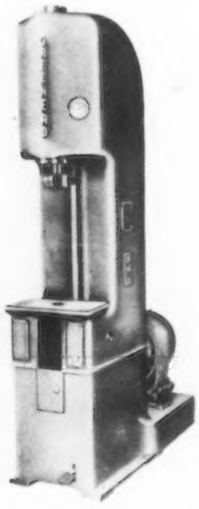


feed with the table continuing in cutting feed in the opposite direction permits rough and finish milling at one loading of the work, using dual feed rates if desired. On many types of work, climb milling in either direction can be used up to the capacity of the driving motors. Double fixture milling is another possibility using one set of cutters—conventional milling on one end of the table and climb milling on the other.

Hydraulic Presses

RUGGED, gap-type hydraulic presses in capacities of 4, 6 and 8-ton pressure have been announced by *Greenerd Arbor Press Co.*, Nashua, N. H. They are of box-type construction, cast of hard Meehanite metal. The cylinder head is a separate unit, honed to size and equipped with steel piston with cast iron rings. The work table is a separate unit also, and can be removed for convenience in at-

taching fixtures or replacing type of work table. On standard models the ram, which has an adjustable travel of 1 to 18 in., is controlled by foot pedal or hand control. The pump is driven by a standard motor



with V belts and the motor is mounted on an adjustable motor bracket for take-up. Presses have been designed, it is pointed out, with the object of being as near an all-purpose hydraulic press as it is practical to build.

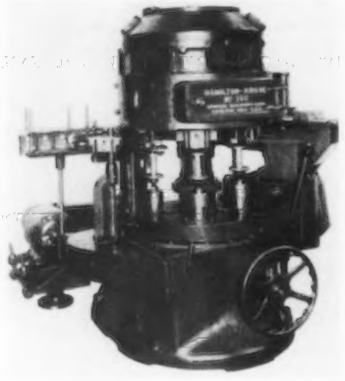
Air Presses

HIGH speed production on such applications as riveting, drawing light materials, forming and operations on all products requiring light, fast work is offered by the

line of air presses manufactured by *Munton Mfg. Co.*, Franklin Park, Ill. These air presses, which deliver 200 strokes per min, are available in capacities of ½, 1 and 2-tons at 80 lb air line pressure. They are built to stand up under high speed operation by the all-welded construction, with ample provision for overloads. Characteristics include two-way cylinders with cushioned top and bottom, and ram guide operated by a hand lever. The press can be mounted on any bench or stand and foot control can be furnished for floor use.

Automatic End Seamer

A HIGH-SPEED automatic end seamer for square and irregular-shaped cans has been announced by *Lima-Hamilton Corp.*, 60 E. 42nd New York 17. Called the Hamilton-Kruse Model No. 150, this is a completely automatic four-head unit with four round rollers on each



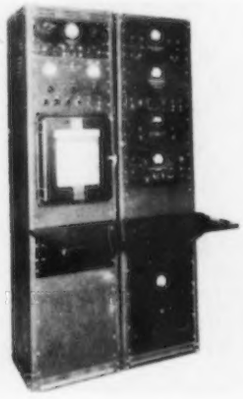
head. In operation, cans remain stationary on the base plates during the seaming. The machine is equipped with automatic body and end feeds, a complete set of seaming parts, and its own motor and control. Features include low speed heads, ease of adjustment, and automatic lubrication. The machine is rated at 150 cans per min.

Buffing Tool

FOR polishing and sanding metal and wood, a buffing tool which fits any chuck on an electric drill or flexible shaft has been announced by *E. K. Bertram Engineering Co.*, 3034 Main St., Kansas City. It is light, maneuverable, easy to operate and the flexible 5-in. rubber disk enables the user to get to all hard-to-reach surfaces. An aluminum casting houses self-lubricated bearings and steel gears that operate in a bath of oil.

Mass Spectrometer

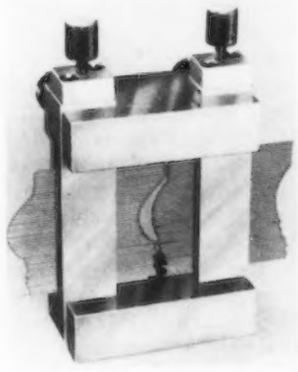
A RECORDING mass spectrometer capable of measuring over the mass range from 1 to 350 and adjustable to any portion of that range, has been announced by *General Electric Co.*, Schenectady. This new instrument incorporates the control and stability features which have made the mass spectrometer a practical method for the chemical analysis of gases and vapors in the fields of atomics, nucleonics, and ionics. The instrument, applicable to general chemical analysis and isotope abundance measurements, is built in two main



units: the control unit containing the electronic components and recorder, and the tube rack housing the spectrometer tube, vacuum pumps, gages, sampling system, and additional components.

Contour Transfer Gage

A SIMPLE, inexpensive contour transfer gage offered by *Thompson Products, Inc.*, Cleveland 17, can be used for the measurements of any radius or contour where other standard measuring devices are not applicable, it is claimed. It can be applied both to checking die cavity contours and



production line parts. The gage provides means for reproducing many curves, which are difficult to gage directly, in a readily measurable form. In conjunction with an optical comparator, the gage permits rapid, simple setup for checking dimensions. A dial indicator or height gage can be used if desired. All pins in the gage are sized with-

in 0.0002 in., making it possible to check contours directly on the comparator by using the opposite end of the pins.

Magnetic Separator

CONCENTRATION and purification of magnetic and non-magnetic materials can be accomplished with the super-high-intensity cross belt magnetic separator announced by *Dings Magnetic Separator Co.*, 4778 N. W. McGeogh Ave., Milwaukee 14. Weakly magnetic materials previously lost in

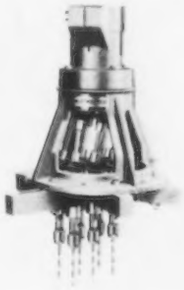
the tailings can be concentrated into their separate, purified and salable forms. The separator is available with any number of cross belts: an eight-belt unit, for example, being capable of concentrating eight separate magnetic products and one non-magnetic. This is accomplished by varying the strength of each cross belt magnet, permitting the separation of materials having different magnetic susceptibilities, as well as separation of magnetic from non-magnetic materials. A high degree of selectivity is obtained through use of three features: extremely high intensity magnetic pole, handwheel adjustment of air gap to increase or decrease the concentration of flux lines at pole nose, and variable speed drive on the main conveyer belt.

Floating Disk Clutch

MAXITORQ floating disk clutches equipped with non-locking type levers have been announced by *Carlyle Johnson Machine Co.*, Manchester, Conn. They are so designed that the clutch cannot be locked into engagement. This type of clutch might be used on machinery equipped with foot pedal operation, or where engagement of the clutch is rapid and frequent, for rapid traverse mechanisms, or for any other operation where it is preferred not to lock the clutch into engagement.

Adjustable Drillhead

FEATURING flexibility of operation and strong construction, an adjustable, multiple spindle drill head with a new universal joint drive has been produced by *Thriftmaster Products Corp.*, Lancaster,



Pa. It has a high overload capacity, made for use with power feed, and is rated at full capacity of $\frac{1}{4}$-in. drills in steel. Gears and spindles are of special alloy, test-hardened steel. The drillhead is furnished with 2 to 6 spindles, minimum $1\frac{1}{8}$ in. center spacing within $6\frac{1}{4}$ in. diam circle. It is made for right hand rotation of the drill press.

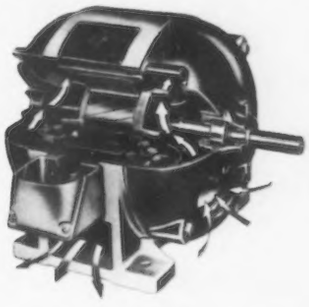
Ejector Type Tools

DEVELOPMENT of many designs of ejector type tools for special work such as special size inserts for heavy or light cuts, has been announced by *Super Tool Co.*, 21650 Hoover Rd., Detroit 13. The special purpose ejector type tool, illustrated, is used on standard turning jobs, and cuts the belt

track on the periphery of a pulley and faces the edges at the same time. Complete tool designs or merely operational details are submitted for the custom built tools.

Electric Motors

THREE new lines of general purpose electric motors designated Permamotors which include fractional hp ratings motors; integral hp ratings, single phase motors; and integral hp ratings polyphase motors, have been announced by *A. O. Smith Electrical Mfg. Co.*, 3538 N. 27th St., Milwaukee. Fractional hp motors are of the capacitor start, single phase type. They are available in the 56 and 66 frames with NEMA mounting dimensions and feature squirrel cage rotors with positive-acting switches. Bronze sleeve bearings are used with wool lubrication reservoirs. Prelubricated, sealed type, ball bearing fractional hp motors are also available. Integral hp motors are of the capacitor start type and are available in 1 to 5 hp and with



frames 203, 204, 224 and 225 with NEMA mounting dimensions. Motors will run either clockwise or counter-clockwise by proper connection of lead wires. The polyphase, squirrel cage, induction motor illustrated is available in frames 203-326 with NEMA mounting dimensions. Ball bearings are interchangeable, permitting shaft extension from either or both ends as desired.

Wire Cloth

PRODUCTION on Specification No. 4200 wire cloth, replacing 200 mesh wire cloth, has been announced by *Michigan Wire Cloth Co.*, 2100 Howard St., Detroit 16. It is said by the manufacturer that the new wire cloth is equal to 200 mesh in filtering and straining action, yet it is seven times as strong. The new material lasts longer and always lays flat. It is available in Monel metal and brass and in other metals to special order.

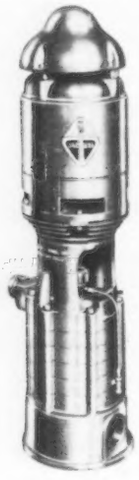
Tool Lubrication

TWO new products for the metalworking industry, a drill lubricator and a saw blade lubricant, are being marketed by *Shell Oil Co.*, 50 W. 50th St., New York 20. The new lubricator, used principally with hand-operated automatic drills up to $\frac{1}{2}$ in., has cut drill breakage as much as 22 pct and drilling time up to 20 pct, it is claimed. The package is designed so

that a rotating drill can be inserted through its top cover into the lubricant, an adjustable bottom keeping the lubricant at the top of the container. Each time the drill requires lubrication, a new hole is made in the top of the container. This insures that metal chips will be kept out of the compound when the drill is inserted and surplus lubricant removed when the drill is withdrawn. The saw blade lubricant is said to increase cutting speeds, prolong blade life, and reduce cutting temperatures and vibrations. The holder for the lubricant, which can be attached to a band saw guard, provides for automatic, self-feeding lubrication.

Boiler Feed Pumps

BOILER feed pumps especially designed for pumping hot water and for other installations requiring high water pressure have been announced by *Jacuzzi Bros., Inc.*, Richmond, Calif. These multistage centrifugal pumps are produced in a vertical design, which cuts to a minimum the floor space



required. It is said the centrifugal vertical design means higher efficiency and less maintenance because the pumps have only one moving part and no close clearances. Standard units vary in size from ½ to 20 hp, and custom-built pumps can be built for specific requirements.

Milling Attachment

CHANGEOVER of the Rusnok milling head to an entirely new setup can be accomplished in a fraction of the time with the new type mounting developed by *Rusnok Tool Works*, 4840 W. North Ave., Chicago 39. This new rail type mounting is fully universal. Milling attachments mounted with the rail type bracket are operated on either side of the overarm or directly in front of the overarm. The milling

attachment can be placed and rigidly locked in any position within a full 180° adjustment. The new rail-type brackets are available and custom fitted to milling machines with round overarm within the range of 3 to 5 in. in diam.

Coating Material

DEVELOPMENT of a coating material that serves as a stop-off for selective hot dip tin plating has been announced by *Acheson Colloids Corp.*, Port Huron, Mich. The coating is applied to that portion of a surface where it is found desirable or necessary to prevent the adhesion of the tin. It will readily withstand a muriatic acid pickling bath used in tin plating operations as well as the fluxing dip and molten tin dip.

Rock Drill

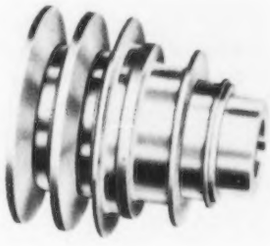
FOR STRIP, open pit mining and quarry work, *Ingersoll-Rand Co.*, 11 Broadway, New York 4, has developed a self-propelled rock drill known as the Quarrymaster which mounts an air-operated, piston type drill that is said to strike more than 200 blows per min. The machine consists of a drill, compressor plant, propulsion equipment, and accessories. Holes up to 6 in. diam. and up to 70 ft. in depth may be drilled. The drill is said to have an unusually high rate of rock penetration. A drill-steel centralizer guides the drill until the bit is well started to permit collaring of holes in uneven ground. The bit is automatically rotated to turn it into a fresh cutting position for each blow which causes a rock cutting rather than a rock crushing action. Compressed air forces chips up hole where they are gathered by a motor operated dust collector. Four independently controlled hydraulic jacks are supplied for levelling the machine.

Platform Truck

PRODUCTION of a new and improved Chore Boy 2000-lb platform truck has been announced by *Buda Co.*, Harvey, Ill. Engine and body are of extra heavy construction. Power is supplied by a twin cylinder Onan gasoline engine, which develops 10 hp and truck speeds up to 12 mph. A 20-sq ft deck loading area and an offset driver's seat facilitating the easy handling of steel rods, pipes and other long material are features of the truck. Outside turning radius of 7 ft permits maneuver up and down narrow aisles and in and out of box cars. Length of truck is 96 in., width 40 in. and wheelbase 59 in.

V-Belt Drive Unit

ADDED to the line of Ball-Lok V-belt clutches is an assembly designed for twin V-belts now available from *V-Belt Clutch Co.*, 3757 Wilshire Blvd., Los Angeles 5. When the clutch is set for idling position, the belts ride on free-turning bearings of double slip-



ring design. When the clutch is engaged for driving position, the belts are gripped by and ride up on axially-moved pulley sidewalls. Shifting force is applied to the walls of the open-channel sleeve and shifter fork assemblies with suitable friction shoes are available. The twin belt model rates at 5 to 10 hp. Pulley diameter is 3¾ in.; length 4⅛ in.; and shaft size range is 1, 1⅛, and 1¼ in.

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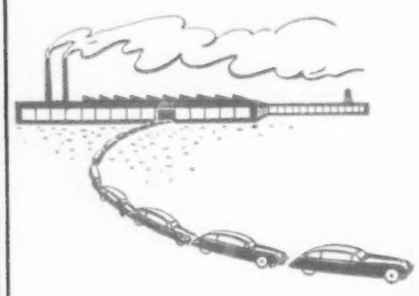
Assembly Line . . .

WALTER G. PATTON

• 1948 auto operations contrast with 1929's record production... Wage negotiations between UAW-CIO and GM, Chrysler and Briggs begin . . . Ford line shut down as Mercury-Lincoln output rises.



DETROIT — With Ford assemblies halted temporarily for a model change, car production totals fell to an estimated 106,000 cars and trucks for U. S. and Canadian plants during the week ended Apr. 3, according to Ward's Reports. Even if it is assumed that the coal strike will have no immediate effect on car assemblies most sources anticipate that car production during April will fall somewhat behind March's record-breaking total of 509,700 vehicles, the highest output report for any month during the postwar period.

Ignoring for the moment the ominous threats of a continuing work stoppage in the coal pits, the international crisis and the growing possibility that allocations will divert badly needed steel from the auto builders, it is interesting to observe that with approximately 1,353,200 vehicles turned out in the first quarter the auto industry seemed a week or two ago to be well on its way toward surpassing its 1929 production record. The miracle of the situation is, however, that the industry could be reaching for the same goal in two widely separated years in which operating conditions are in such sharp contrast.

For example, in 1929 most auto plants were working most of their departments three shifts. Today, no major assembly plants are regularly working three shifts and only scattered departments are operating continuously. A few foundries, trim departments and units of the press shop are working dual shifts.

To continue the comparison, in 1929 raw materials, while tight in spots, were not a source of continual anxiety. Expediters and airplanes in the purchasing department were virtually unknown 20 years ago although today they are a virtual necessity.

Just before the big depression hit in 1929 the labor unions were hanging on the ropes; prosperity had ruined them it was said. Today the auto industry is organized vertically to a point where auto management is charging the unions with monopoly and a desire to expand the field of collective bargaining to a point where management can no longer manage its own business. Monopoly, it is asserted, is now on the other foot.

But the contrasts do not end here. In 1929 the peak production came on the eve of the greatest depression this country has ever known. It was difficult to sell all the cars produced. Today, most marketing experts feel the market will easily absorb all the cars that are built, even at today's high prices.

The optimism of auto sales managers has considerable foundation in fact. For instance, the average age of cars on the highway today is 8½ to 9 years compared with an estimate of 4½ to 5 years in 1929. In addition, it is argued that market analysts often fail to give proper consideration for the sharp increase in population of this country which had to be ignored so far as transportation was concerned during the war. The country can easily absorb the 1948 output—and '49, too—it is claimed, so far as its actual transportation *needs* are concerned.

ANOTHER interesting contrast is the growing importance of the cost of raw materials in today's automobile economy. Twenty years ago auto management was buying in a more competitive market than at present. In many cases the industry was able to benefit extensively through competition. Today's competition, on the other hand, is mostly for materials, with the materials often going to the highest bidder. Despite today's high direct labor costs, it is reported, the cost of purchased parts and materials (which also represent a large amount of labor, of course) offer a much greater challenge for effecting cost savings than reductions in direct labor cost at the factory. This situation was reversed in 1929.

An auto producer has recently reported, for instance, that 80 pct of its 20 gage sheet is being bought in the conversion market at a cost of $200 per ton and upward. This is an exceptional experience which applies only to 20 gage material but a number of independent producers are buying 15 to 25 pct of their requirements in the conversion market for which they pay approximately $100 over the quoted mill price.

The industry, of course, has not forgotten to compensate itself for its extra expenses. Most estimates place the prices of passenger cars at more than double the 1929 figures and the industry's earnings —on a much higher investment base, of course— are at an all-time high. Yet the industry is genuinely concerned as to whether or not even its increased earnings will enable it to replace its equipment with efficient machines as rapidly as its present tools become outmoded. If an auto executive worried very long about the same question in 1929 he kept his thoughts on the subject mostly to himself.

Back in 1929 the international skies were reasonably clear with only the much-talked-about war debts beclouding the horizon. In these times, debts are forgotten during a hectic period where, to many observers, our continued existance as a free nation is at stake.

The contrasts between 1929 and 1948 are everywhere auto management cares to look. All of which may explain partially at least the entirely new labor policies at Ford and the development of a new la-

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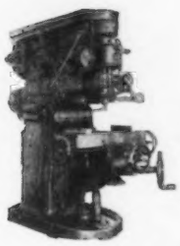

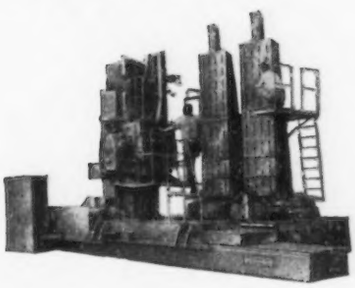

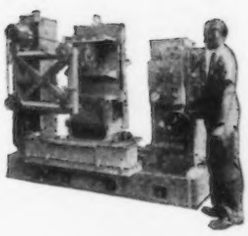

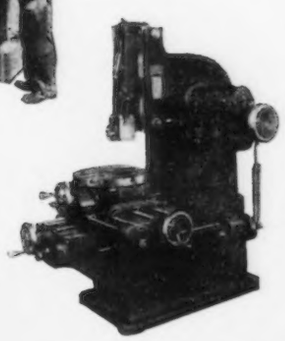

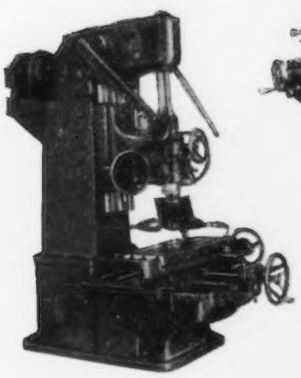

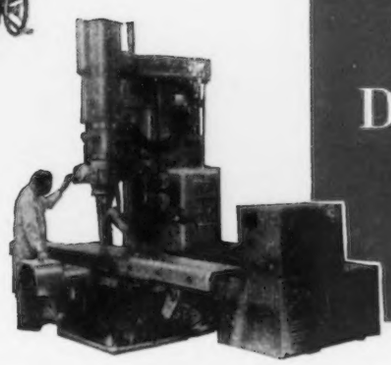

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5. JIG BORERS, for precision-boring of punch and die sets and intricate molds and dies, of all kinds.
6. JIG GRINDER, for relocating and finish-grinding straight or tapered holes to "tenths," in hardened steel (First shown at the '47 Machine Tool Show.)
7. KELLERFLEX MACHINES — flexible shaft equipment for efficient finishing of dies and molds. Both multi-speed and direct drive types, in 14 models.

NOT ILLUSTRATED: KELLER CUTTER AND RADIUS GRINDER: sharpens die-sinking and Keller cutters, shapes Keller tracer points. VERTICAL DIE GRINDER: prepares new die block surfaces prior to machining, sharpens dull dies, reconditions die block faces before resinking operations. BURS (rotary files); used in Kellerflex and similar machines, for finishing jobs. P&W furnishes hundreds of styles, shapes, sizes in both high-speed steel and carbide, plus grinding and polishing wheels, etc. SMALL TOOLS: including die-sinking cutters, Keller cutters and tracer points, drills, reamers, counterbores, end mills for jig borers. P&W GAGES: entire range of cylindrical gages, thread gages, snap gages, precision gage blocks, and basic measuring equipment.

PRATT & WHITNEY
Division Niles-Bement-Pond Co.
WEST HARTFORD 1, CONNECTICUT

PRATT & WHITNEY
Die-and Mold-Making Equipment

"There is no better-paying investment than the right tools for the job"

bor psychology at General Motors. The fact that the "load factor" on auto plants is so much lower today than a few years ago may also account for a number of changes in auto management policy. Apparently about all the years 1929 and 1948 have in common so far as the auto industry is concerned is the same production goal. And even that is different because today's cars are so different from the cars being built in 1929. Twenty years make a lot of difference in the auto industry—and that's for sure!

* * *

PRELIMINARY sparring between the UAW-CIO and negotiators for General Motors, Chrysler and Briggs, is now taking places. At the same time General Motors is holding parallel wage and contract negotiations with the United Electrical, Radio and Machine Workers of America-CIO. It may be recalled that on two previous occasions the Electrical Union has undercut the UAW-CIO by concluding a contract at a wage level less than that sought by the union. Up to the present time, no statement has come from either the management or labor side of the table.

Demands on Briggs served this week follow closely the pattern previously adopted by the General Motors and Chrysler workers' conferences.

The Briggs demand calls for a general wage increase of 25¢ per hr to compensate for increased living costs. In addition, the union is demanding comprehensive social security coverage to be paid for by the company including life, health, accident, hopsitalization, surgical and medical insurance.

The union is also asking Briggs to provide 1 weeks' vacation pay for employees with 6 months seniority with graduated increases to provide for 3 weeks' vacation where the worker has 5 years or more seniority. At the present time workers with 1 year seniority or more receive a weeks' vacation with pay; workers with 5 years or more receive 2 weeks vacation with pay.

The union is requesting a change in holiday pay provisions which, it contends, have proved "inadequate in many ways". The union is also asking for a guaranteed weekly wage of 40 hr for any week in which the employee is called to work. It has also requested 4 hr off with pay for workers when primary and general elections are held in Detroit. According to the union, this will "make certain that every worker participates in making democracy work by voting on election day."

The usual union demands for elimination of wage differentials between different cities in which plants are located and elimination of alleged wage inequities between certain classifications are included in the union program.

While most informed sources here are inclined to the belief that a substantial increase in wage rates will be granted, most observers feel that the demand for equalization of wages or extensive revisions to holiday or wage classifications will be turned down.

* * *

THE last of the 1948 model Fords have come off the assembly line and preparations are now being made to get the 1949 models into production.

Meanwhile, production of the new Mercury is going forward at the Rouge while new postwar Lincolns are being built at the Lincoln plant here in Detroit. In addition the new branch assembly plants have commenced production of Lincolns and Mercurys at Metchum, N. J., St. Louis and Los Angeles. According to Ward's Reports, 170 Mercurys and 330 Lincolns were produced during the week ended Mar. 27.

According to Ford sources layoffs of workers have been held at a minimum during the model changeover. Ford management reported only 12,000 Rouge workers were temporarily laid off during the week of Mar. 22. In the meantime, Ford is pushing production of new trucks up to the limit. Truck assemblies are now running in excess of 1600 units a day, the highest production figure in the history of the company.

Incidentally, Ford has made a record payoff to one of its foundry employees under the Employee Suggestion Plan.

Previously, Ford cylinder head castings were transferred to a continuous shot blast machine by means of a steel chute which also carried a substantial quantity of sand from the vibrater to the belt. This caused a dusty area in which an operator had to stand at all times to guide the heads properly on the belt. The employee suggested the installation of a section of gravity rolls with side and top locating guide rails and troughs to catch the sand and deposit it in a large disposal hopper. This not only eliminated a dusty condition in the foundry but saved the amount of time spent previously in guiding the heads on the belt.

* * *

THE effects of John L. Lewis' private war on the administration are coming home to the auto industry. With no settlement of the pension controversy in sight, steel buyers were anticipating substantial cuts in their steel supplies ranging from 30 to 70 pct. If these cutbacks are necessitated by the coal strike it is expected that at least one major automobile company will be forced to suspend operations within a fortnight. As some observers here see it, restrictions on transportation may turn out to be as serious so far as automobile companies are concerned as shutting down openhearths and banking blast furnaces.

Receive Highest Pay

Washington

• • • **Tool and die** makers are the highest paid workers in the machine tool accessory industry, according to the BLS, with average hourly wages ranging from $1.58 in Hartford to $2.10 in Detroit. Class C milling machine operators averaged the lowest, from $1.25 to $1.40 in the 13 cities surveyed.

Workweeks average 40 hrs with paid vacations of a week, after a year, provided by most plants in this industry.

Romney Leaves AMA

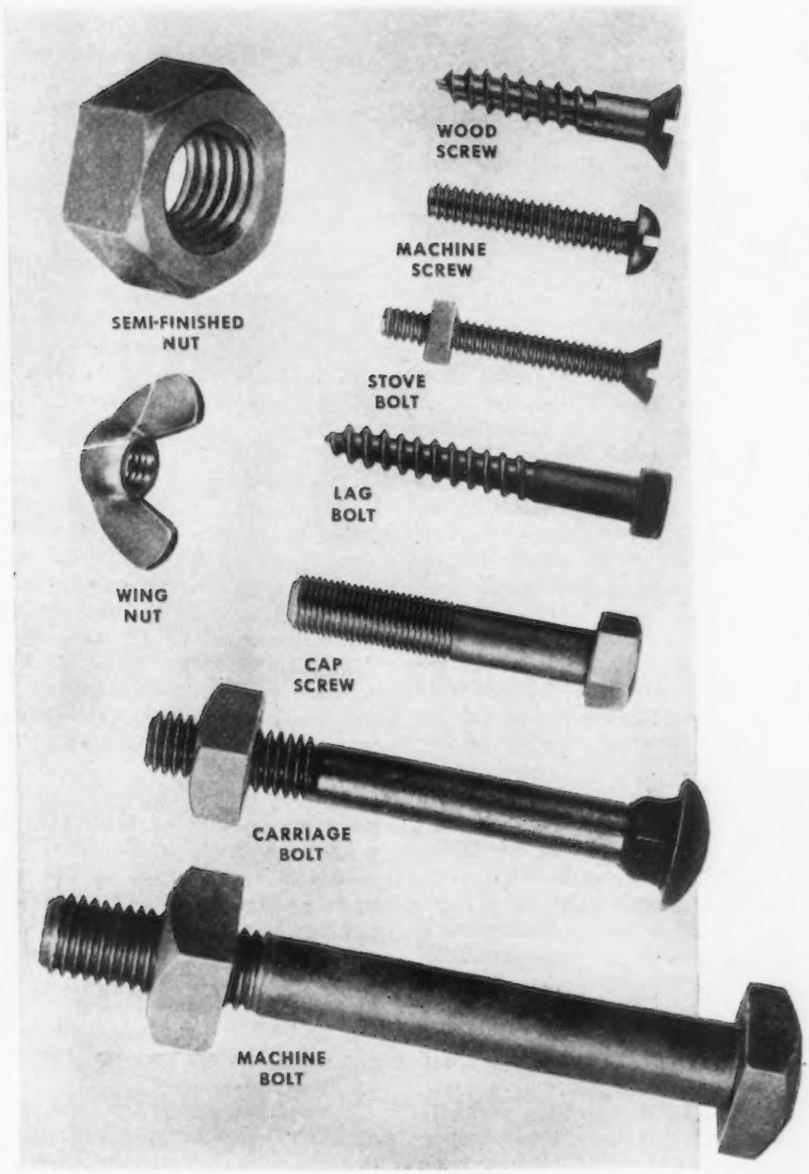
Detroit

• • • **George Romney,** for the past 9 years managing director of the Automobile Manufacturers Assn., has been named assistant to the president of Nash-Kelvinator Corp., George W. Mason.

Mr. Romney wil be succeeded by William J. Cronin, who has been associated with AMA since 1933. Since joining AMA, Mr. Cronin has been secretary of the AMA Manufacturers Committee and the Sales Managers Committee.

"NATIONAL'S" COMPLETE FASTENER LINE

Makes your buying EASIER



You can buy all your headed and threaded fasteners from one source when you order from "National". For standard bolts, nuts and screws, or special fasteners to meet your individual problems, "National Screw" has the facilities to make every type of fastener you require.

With its wide variety of manufacturing equipment, "National" is the only manufacturer who makes all of the fasteners illustrated here. Also, "National" makes tacks, rivets, cotters, tapping screws, plow bolts, locknuts and many other fasteners.

For the products you manufacture, "National" can supply you with the right fasteners to make your products fit better—stay tighter—or operate more smoothly.

Dependable Uniform Quality

Note the well-formed heads and clean, sharp threads on these bolts and screws. The nuts are uniformly well-made to give a smooth, even fit.

National PRODUCTS

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

Washington . . .

EUGENE J. HARDY

• NSRB, master mobilization planning agency, speeds organization . . . Will catalog resources, needs and production potential...Seeks industrial, professional and business cooperation.

WASHINGTON — For the first time in its history, the United States will systematically measure and catalog its resources of material, production and manpower. This is the job handed to the National Security Resources Board, created under the Security Act of 1947.

Undoubtedly prodded by continuing world unrest, the Board has been rapidly organizing for a thorough inventorying job. In addition to setting up the framework for industrial advisory committees in iron and steel, nonferrous metals, rubber, oil and other industrial fields, the NSRB has also set in motion a survey of key personnel in both government and business.

First attention is being given to present and former (wartime) topflight government personnel. At present, a limited number of 50 or so will be sought for permanent positions with the board for the purpose of directing the work of the 20 planning divisions now being organized. Some will be asked to transfer from present government posts; others will be recruited from former outstanding personnel of the disbanded war agencies such as WPB, CPA, OPA, etc.

In addition, when the program gets rolling, leading figures in the business and professional world will be requested to serve a temporary "tour of duty" of several months duration. The Board has brought in Harvard University's personnel expert, Edmund Wright, to set up the planning groups.

The basic purpose of the NSRB, as authorized by Congress, is to develop policies and plans for coordinating civilian, industrial, and military activities for meeting exigencies during both peace and wartime. More specifically, its duty is to determine what the nation needs, what it has, what it hasn't, and where and how it can get the things it lacks in any quantity.

Although a civilian peacetime agency, in the event of an emergency the NSRB automatically becomes the government's master planning and control agency. Under it would be established an office of national mobilization which, guided by the board's accumulated information and its outlined policies, would decide how the nation's production and manpower should be divided up between civilian economy and military necessity.

OPERATING agencies, under the board, would clamp strict controls on production, domestic economy, transportation and communication, shipping, manpower, etc. These would correspond roughly to the war agencies such as WPB, OWMR, ODT, OPA, etc., but under a single head.

Working out broad plans and policies in itself is a major task. For instance, in charting a mobilization plan for the steel industry it is necessary to determine the military and civilian needs under any given condition plus probable production facilities needed in each instance.

Against these must be balanced current capacity plus expansion programs either planned or under way; presumably this would include marginal and any other facilities now in disuse for any reason but which could be put back into operation. Also, it would include standby plants as well as warbuilt facilities sold to private operators with a recapture clause in the disposal contract.

The difference in totals (requirements v. capacity) would result in new capacity deemed essential for all-out emergency production. This poses another question: Where should the new facilities be located?

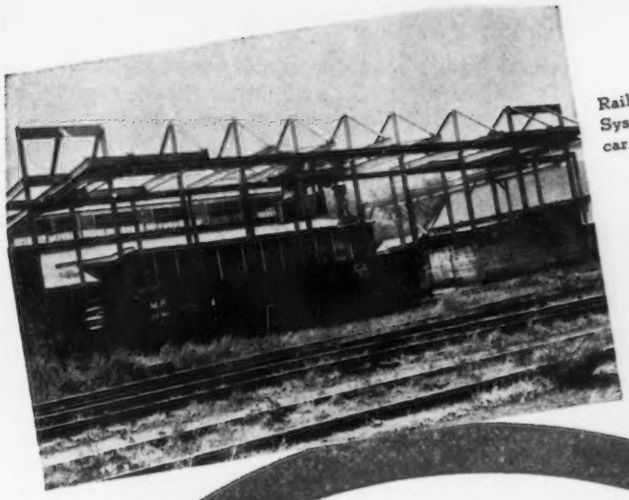
"This is a problem on which we are most anxious to have assistance of the best minds of industry," a spokesman for NSRB told THE IRON AGE.

Despite talk of industry going underground, this is currently given much less attention, for obvious reasons, than dispersal plans —that is, placing new facilities in widely separated locations so that no single blow or air raid would constitute a major disaster. This in turn raises the problem of the availability of raw material, power, water, transportation, housing and other facilities.

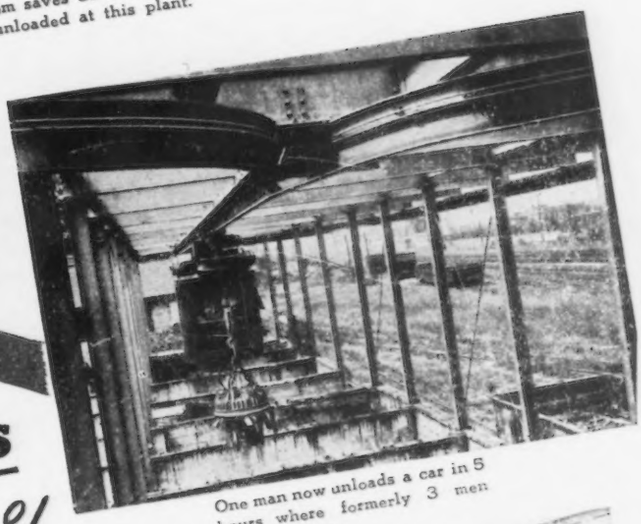
In the matter of supplies, resources and similar problems, the board can draw on the wealth of statistics accumulated by the war agencies and bring them up to date; as to relocation of industrial facilities, it must start from scratch. Some work had been done in this direction, beginning in early 1945, but following production cutbacks and VE-Day, these efforts were virtually abandoned.

With some exceptions, the same planning formula must be followed in respect to coal and fuel, iron ore and other raw materials industries. Then planning must branch off into other manufacturing fields and extensive surveys of facilities carried out.

Each factory or establishment



RailMaster 5-Ton MonoRail System saves 31 hours for each car unloaded at this plant.

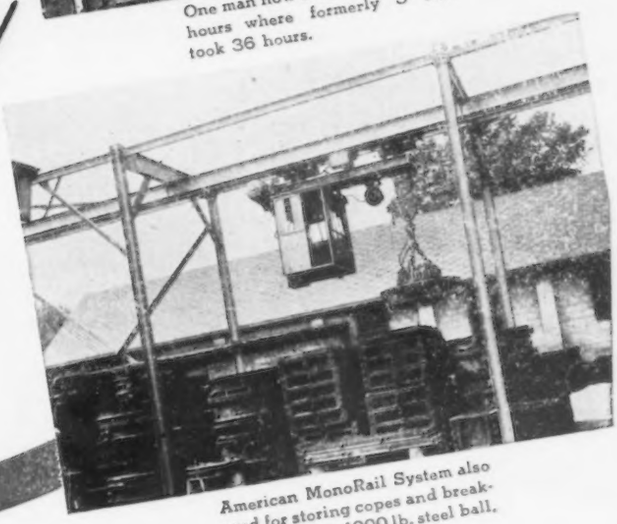


One man now unloads a car in 5 hours where formerly 3 men took 36 hours.

Handling Costs Reduced 86%

with

AMERICAN MONORAIL

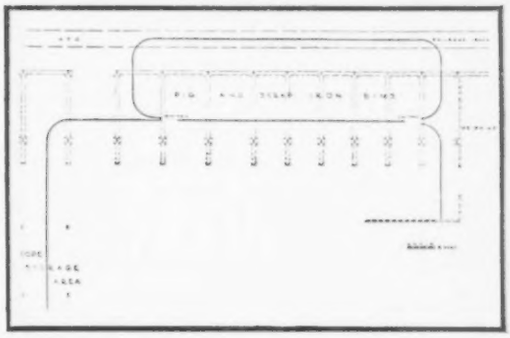


American MonoRail System also used for storing copes and breaking scrap with 1000 lb. steel ball.

At this plant it formerly took 3 men appoximately 36 hours to unload and store a car of pig or scrap iron. With the American MonoRail system one man now accomplishes the same job in 5 hours.

The savings in time is just part of the story since the system is used for breaking scrap as well as storing copes.

American MonoRail engineers often prove marked reduction in handling costs. They have hundreds of cases from which to draw. A consultation can be quickly arranged.



SEND FOR BULLETIN C-1. A 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

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must be surveyed with an eye to (1) what defense needs could be manufactured, (2) its capacity and estimated production schedule, (3) time required for conversion, and (4) potential availability of subcontractors if needed.

ANOTHER major factor to be considered and provided for in all surveys, studies and recommendations in relation to the foregoing is manpower—how much is available, by skills and occupations, and where additional workers are to be obtained.

Current recruiting activities and screening of personnel is for the purpose of forming the nucleus of permanent staffs for the presently planned 20 mobilization planning divisions of the board. These will be divided into the following four main groupings:

(1) Industrial Resources — power and utilities, transportation, communication, and production facilities.

(2) Material Resources—iron and steel, nonferrous metals, petroleum and fuels, chemicals-rubber-plastics, agricultural products, textile-leather-fabrics, and timber and forest products.

(3) Human Resources — manpower, community facilities, information and censorship, and medical.

(4) Organization and Management — economic stabilization, foreign economics, and organization and procedure.

Each planning division is charged with collecting and maintaining essential data and information relating to its respective field. This is to be analyzed and used as a basis for estimating future resources, requirements and deficiencies.

A large measure of assistance in the big fact-finding job has been rendered to the board in the form of a White House Executive Order. It directs the various government departments and agencies to "furnish the Board with such information, reports, statistics and other documents" considered necessary in accomplishing the planning job.

Screw Machine Group Names New Officers

Chicago

• • • **Members of the** National Screw Machine Products Assn., national headquarters in Cleveland, at their annual convention here elected the following officers and directors: President, Robert Chestnut, Edgewater plant, Aluminum Co. of America, Edgewater, N. J.; vice-president, Charles D. Hoyt, Jr., Charles D. Hoyt Co., Mishawaka, Ind.; treasurer, William N. Grass, M. J. Grass Screw Machine Products Co., Buffalo.

Directors were: E. H. Baker, Jr., Locke Machine Co., Cleveland; James P. Baldwin, Corbin Screw Div., American Hardware Corp., New Britain, Conn.; Kenneth Biddle, Biddle Screw Products Co., Sheridan, Ind.; J. S. Elsby, Screw Machine Products Co., Milwaukee; R. A. Galorneau, Central Screw Products Co., Detroit; Orrin D. Gray, Machinery Products Corp., Chicago; Walter A. Heimsch, Dayton Appliance Co., Dayton; Charles H. Hyde, David Bell Co., Inc., Buffalo.

Also Robert C. LeMay, Waterville Mfg. Co., Waterville, Conn.; Rollin J. Lobaugh, Pacific Screw Products Co., San Francisco; C. E. Lucas, Lucas Screw Products, Inc., Rochester, N. Y.; Eric Nord, U. S. Automatic Corp., Amherst, Ohio; Standley Redmer, Redmer Sons Co., Chicago; Camiel Thorrez, Thorrez & Maes Mfg. Co., Jackson, Mich.; Daniel F. Viles, Waltham Screw Co., Waltham, Mass., and Roy V. Woodworth, Progressive Service Co., St. Louis.

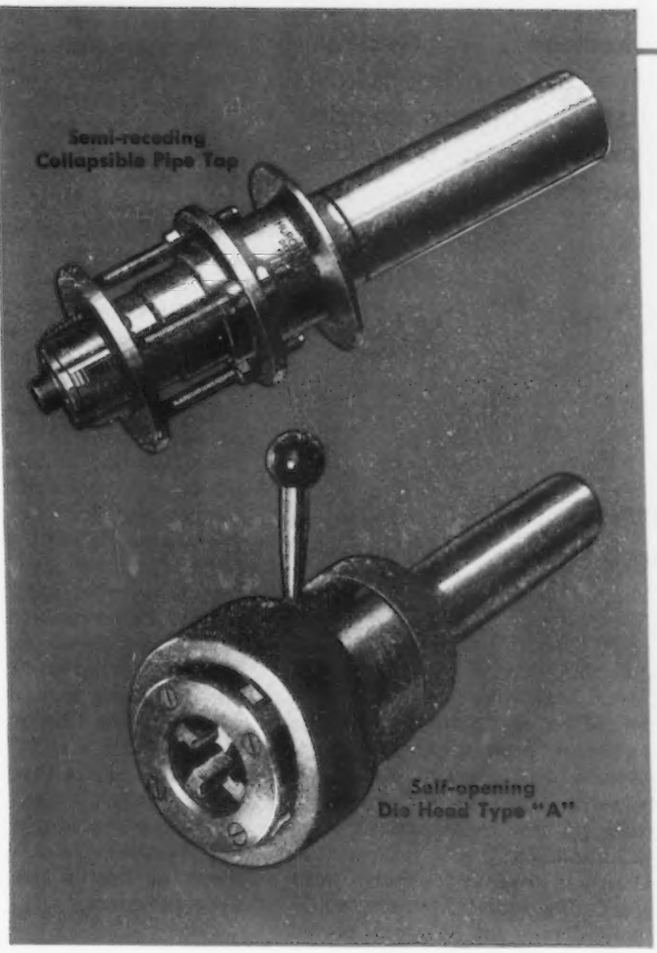
Orrin B. Werntz, manager and counsel of the association for the past 11 years, was reelected executive secretary. Mrs. Margaret Ballinger was reelected secretary.

Special "Old Timer" awards for those having 40 or more consecutive years in this industry were presented at a banquet to the following: L. F. Schulze, Peerless Automatic Machine Co., Cleveland, 40 years; David Smyth, The Peck Spring Co., Plainville, Conn., 43 years; Arthur W. Lubenow, Arthur Lubenow Co., Milwaukee, 54 years.

Special merit certificates, of which only 12 have been issued in the 15 years of the association, were given to Melven K. Kuntz, Ohio Metal Products Co., Dayton, and Cecil E. Lucas, Lucas Screw Products, Inc., Rochester, N. Y., for outstanding meritorious service over a number of years on behalf of the industry and the association.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

A BETTER, MORE ECONOMICAL METHOD OF THREADING PIPE



The Murchey Pipe Tap

illustrated is a semi-receding, collapsible unit for cutting taper threads from 1¼" to 7" in diameter in cast iron or other materials of similar hardness. Larger sizes are available. For harder materials, the Murchey full receding tap is preferable. Either is used on standard automatic screw machines, drill presses, turret lathes, hand screw machines and special threading machines. These tools can also be arranged to cut straight threads. Both are available in the lever-operated or rotating type.

The Murchey Pipe Die

Types A and C are used for cutting taper pipe threads from ⅛" to 6". Larger sizes are also available. Type A is a stationary pull-off unit for use on machines where the tool is stationary.

Type C is a yoke-operated tool for use on machines which rotate the tool. Excellent production records have been achieved by these tools on a wide range of pipe threading work.

2935

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Lowest cost per thread . . .
WITH MURCHEY TOOLS

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SUBSIDIARY OF THE SHEFFIELD CORP.
DAYTON 1, OHIO, U. S. A.

Manufacturers of collapsible taps, self-opening die heads (tangent and radial chaser types) and special threading tools

West Coast . . .

ROBERT T. REINHARDT

• Central California steel producers hit by both electric power and coal shortage . . . Geneva down to standby conditions . . . Seattle electric furnace blast cause unknown.

SAN FRANCISCO—Plagued by a shortage of electric power and beginning to feel the effects of the coal mine work stoppage, steel producers in central California had reason to believe they were once more justified in dusting off that much abused word "discrimination."

Almost a year ago there were strong indications that there would be a shortage of electric power (THE IRON AGE, Aug. 28, 1947, p. 94 and earlier) and a winter of subnormal precipitation made the shortage a reality to the extent that all industry in the area served by the Pacific Gas & Electric Co. has been forced to curtail electric power consumption 20 pct.

It is generally admitted that this area is short approximately 250,000 kw even after getting help from southern California sources and that additional power from Shasta Dam and steam plants will relieve this shortage to the extent of about 150,000 kw within a few weeks.

Introduction of daylight saving time throughout the state, voluntary curtailment of use in homes and stores and forced cutdowns in industry are temporary expedients expected to carry the area through until additional steam plants and hydro-electric plants are in operation. Recent heavy rains have reduced the agricultural pumping load and storms have increased snow packs in the high Sierra to afford some relief for the present and a little more assurance of runoff into reservoir this summer.

With industrial power demands piling up, the more pessimistic see little hope for abundant power in the area even with all the new facilities on order by PG&E and coming into production on Bureau of Reclamation projects.

A survey shows that but little actual ingot production has been lost because of the power shortage. Pacific States Steel Co. at Niles, Calif. which operates five electric furnaces with an annual capacity of approximately 100,000 tons per year, has had to cut back about 20 pct by reducing shifts from 10 to 8 hr per day for the past 4 weeks. Bethlehem Pacific Coast Steel Corp. here, curtailed rolling production for the first week to conserve power, but since then they have substituted diesel powered air compressors to lighten the power load and are back to a normal production schedule. Columbia Steel Co. at Pittsburg, Calif. hasn't been so fortunate and although ingot production continues as high as the pig and scrap shortage will allow, rolling schedules have been upset and there has been a loss of tonnage in some products.

COLUMBIA faces a serious problem in late May or June when its new cold rolling mill is scheduled to start operations. There is no assurance that enough electric power will be available at that time to bring this mill into full operation. Sixteen hundred tons of coiled steel is already at the mill site having been brought in from Tennessee Coal Iron & Railroad Co. at Birmingham for finishing.

Most steel fabricators haven't been too seriously affected by power curtailment although in a few instances 4-day weeks have become the rule to meet the 20 pct reduction requirements.

The coal shortage has hit Geneva Steel Co. hardest (see Salt Lake) with Kaiser Co., Inc. well set for 5 weeks of normal operation and other producers in the West still relying heavily on scrap. Gray iron foundries will be hard hit within another week.

SALT LAKE CITY—Shutdown of the coal mines is a blow below the belt for the Geneva Steel Co. plant since coal has always been a critical material here because of the scarcity of coal cars and miners. Hence no large stockpile of this material had accumulated and with the closure of the mines, blast furnaces have been put on a rigid diet. The furnaces at both Geneva and Ironton are down to virtually a standby operation. Two of those at Geneva are banked and the third operating at a reduced capacity. Three of the four coke oven batteries are out of production and all but two of the nine openhearths are down. Slab and blooming mills have ceased operations and the structural mill is on a one turn basis, the plate mill still operates on two turns but will probably shut down completely this week.

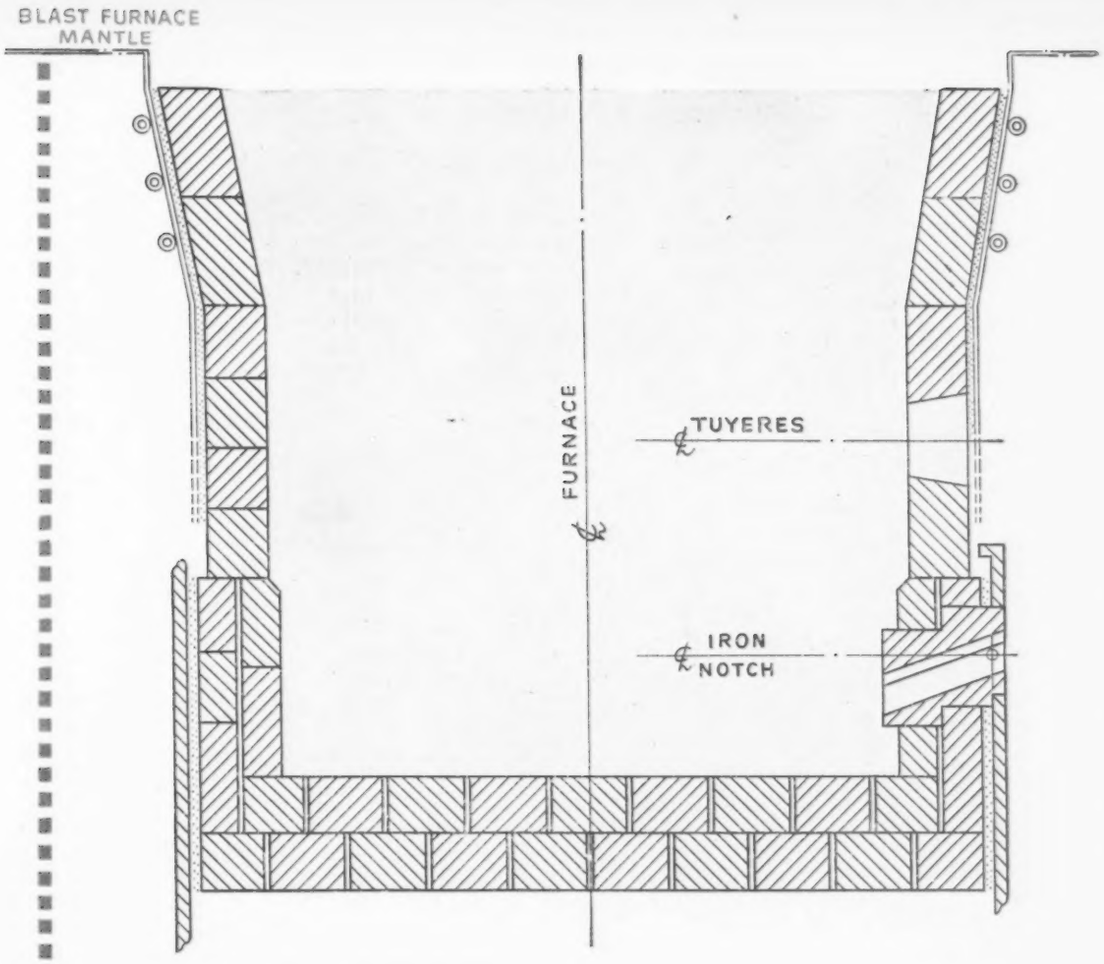
At Ironton 27 of the 56 coke ovens are operating which is considered the minimum for the protection of the unit.

Employment cuts have been stalled off thus far by rotating crews on a reduced work week basis but last week it was estimated that layoffs will begin this week unless the mine walkout is ended.

Approximately 4000 employees of coal mines are affected by the closure of underground operations in this state and the economic loss of wages is being felt throughout the area.

It is interesting to note in a publication just released by the Bureau of Economic and Business Research, School of Business, University of Utah that approximately 6 million tons of coal were produced in the state during 1946. In a comprehensive analysis of all of the economic measures which have wrought changes in Utah between 1847 and 1947 this report shows that since 1870 when 5800 tons of bituminous coal were mined in the state, growth of this industry has been rapid and reached a peak in 1944 when approximately 7 million tons were brought to the surface. This report indicates that in 1946 approximately ½ million tons of coke were produced in the state and that the high point in coke production was reached in 1944 when approximately 760,000 tons were produced.

At the present time there are 308



Line it up to the mantle... with "National" Carbon

"National" carbon blocks have become the standard material for blast-furnace linings, for iron notches and cinder notches. And now, for real economy and efficiency, the trend in design takes the carbon-block lining up to the mantle.

Here are the reasons:

1. "National" carbon blocks last indefinitely. They have no melting point . . . are highly resistant to slag attack and thermal shock . . . are not wet by molten metal . . . have low thermal expansion . . . and maintain their mechanical strength at high temperatures.

2. "National" carbon blocks are easy to install. One carbon block takes the place of from 50 to 1000 nine-inch firebrick, depending on the size of the block. This means fewer joints, sounder joints, faster installation, and lower cost.

For more informaion on the use of "National" carbon blocks in blast furnaces, write to National Carbon Company, Inc., Dept. 1A.

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STEEL SCRAP IS URGENTLY NEEDED. BE SURE TO TURN YOURS IN!

coke ovens of the byproduct type in the state and 297 beehive type ovens operatable.

SEATTLE—With the cause of the explosion of the electric furnace of plant number two of Isaacson Iron Works here Easter night still undetermined last week, scrap was being even more carefully scrutinized by other producers in this area who believe the blast may have been caused by an uncut gas cylinder inadvertently being included in the furnace charge.

Officials of the Isaacson Co., navy officers and state safety inspectors termed the cause of the explosion a complete mystery. Company men state that immediately after the explosion the heat was removed from the furnace and no butts of a cylinder were found as is usually the case. The principal charge consisted of ship scrap and all material going into the furnaces had been carefully inspected since the company had already experienced two other explosions earlier this year.

This most recent blast sent four men to the hospital, two of whom were released the following day.

Damage to equipment was not serious and it was reported that operations could have been resumed late Monday afternoon but the safety board refused to issue the necessary permit.

The plant is still owned by the U.S. Navy and the findings of the naval investigators were being held until approval of the commandant of the 13th Naval District was secured, it was reported.

Intensive efforts are being made to determine the cause of the blast since it was the sixth or seventh to occur in the northwest within the past 12 months. One of the previous explosions at Isaacson's was caused when ice which had lodged in some scrap pipe melted and created a steam pocket.

In the light of the government increased armament program there has been some speculation as to whether LFTs will continue to be scrapped. In general it is believed that this operation will continue since most of these vessels are outmoded. Early in March, Consolidated Biulders of Portland bought ten, Seattle's Bethlehem Pacific Coast Steel Corp. got four and Dulien Steel Co. purchased one of these ships which were offered at auction. Fifteen more were scheduled for sale last week and 21 more go on the block at Fort Townsend, Wash. on Apr. 13.

THE early start of construction on the Tacoma Narrows bridge is expected to put a heavy drain on suppliers of reinforcing bars and structural shapes although probably only a fractional part of this material will be produced in this area. Bethlehem Pacific Coast Steel Corp. received the award as general contractor with a bid of $8,263,904, and John A. Roebling's Sons Co. of San Francisco will do the cable work on a bid of $2,932,-681. The structure will utilize approximately 16,000 tons of structural members, 950 tons of reinforcing bars and approximately 5300 tons of cable in addition to 4 or 5 hundred tons of miscellaneous steel.

It is estimated that this structure will be completed in approximately 30 months and replaces the span which collapsed spectacularly in 1940 after having been built at a cost of approximately $6½ million.

Closure of coal mining in the state in conformity with the national pattern has thrown approximately 1500 miners out of work and 30 of the 36 mines which had been in operation were effected. The six mines in southwest Washington still open altogether employ only about 110 men. Approximately 4500 tons of coal per day are being lost through the shutdown.

SPOKANE—Chromium Mining & Smelting Co. of Chicago and Buffalo expect to begin producing ferrochromium and ferrosilicon within the next 2 months in the electric furnaces near Mead which during the war produced the latter alloy for use in the production of magnesium at the Mead plant.

Since the Dept. of Justice has approved the lease of these premises for 5 years and power assured by the Bonneville Power Administration, arrangements have been made for the delivery of chromite ore from New Caledonia, India and South Africa.

Full scale operations of the furnaces will depend upon the result of an experiment to test the plant and equipment. During the war this operation was under control of the Electro Metallurgical Corp.

This local operation may give impetus to chromite mining in the northwest which ceased operations after the Metals Reserve Co. quit buying the materials for stockpiling. The Oregon chrome mine on Illinois River, Josephine County, Oregon has already resumed production and is shipping ore to the Ohio Ferro-Alloys Co. in Tacoma, Wash. at the rate of 500 long tons per month.

The vacuum furnaces in the former magnesium producing plant have been leased to the Pen Orielle Mines & Metals Co. of Spokane which intends to experiment in the reduction of metallic zinc by a new distillation process.

Both the lessees must keep the equipment in such condition that it could be converted to the production of magnesium within 120 days.

Recent Railroad Business

• • • **Railroad awards** in recent weeks included the following:

The Chicago & Rock Island R. R. has ordered 1000 box cars from Pullman-Standard Car Mfg. Co. to be made at their Michigan City plant. The Rock Island has also ordered 500 70-ton hopper cars from the American Car & Foundry Co. at St. Louis. The Duluth, Mesabi & Iron Range Ry. Co. has ordered 70-ton ore cars from Pullman-Standard Car Mfg. Co., at Butler, Pa. The Chicago & Rock Island R. R. has ordered 59 diesel electric locomotives of the branch line, freight and switcher types, broken down as follows: Five 1500-hp branch line units from Electro-Motive, ten 4500-hp freight locomotives from Electro-Motive, ten 1000-hp switchers from Electro-Motive, 29 1500-hp branch line locomotives from American Locomotive Co., five 1000-hp switchers from American Locomotive. The Southern Pacific has ordered 8150 freight cars as follows: 1000 50-ton drop bottom gondolas to Bethlehem, 3350 50-ton box cars to Pullman-Standard Car Mfg. Co., Bessemer, Ala., 1000 50-ton drop bottom gondolas to General American Transportation Co., 1500 70-ton flat cars to American Car & Foundry at Madison, Ill., 700 50-ton tight bottom gondolas and 600 50-ton flat cars also to American Car & Foundry, Madison, Ill. The Norfolk & Western R. R. will build 1000 70-ton hopper cars of the all steel type in their own shops.

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o o o

• **Charles H. Harris** has been named manager of the new Decatur, Ill. works of the General Electric Co.'s Plastics Div., Pittsfield, Mass. Mr. Harris, who has been assistant to the manager of the plant as well as works accountant, came to General Electric in 1930.

• **H. F. Groendyk** has been appointed to the position of director of product sales of the Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Groendyk was formerly manager of the division's automotive, agricultural and aviation department.

• **Dr. John A. Hutcheson** has been appointed director of the Westinghouse Research Laboratories, East Pittsburgh, succeeding **Dr. L. Warrington Chubb.** Dr. Chubb, who is retiring from active direction of the laboratories, has been named director emeritus and will continue to serve in an advisory capacity. Dr. Hutcheson assumes his new post after 4 years as associate director of the laboratories.

• **R. F. Teeling** of Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J., has been appointed manager of the North Jersey branch. Mr. Teeling has been with the company for 36 years.

• **J. J. Grady** has been elected president and a director of Exothermic Alloys Sales & Service, Inc., Chicago, to fill a vacancy created by the resignation of **Frederick J. Griffiths. D. V. Hamilton,** sales manager, has also been elected a director of the company. **D. D. Tipton** has been appointed treasurer.

• **Arthur E. Maha** has been appointed assistant sales manager for the central division of the Ball & Roller Bearing Div., Link-Belt Co., with his headquarters at the Dodge plant, Indianapolis. **Lewis M. Watkin, Jr.** has been appointed assistant sales manager for ball and roller bearings in the eastern division, with headquarters in Philadelphia. Mr. Maha has been with Link-Belt since 1938. Mr. Watkin joined the organization in 1945.

• **C. E. Teague,** former extension dairyman at Alabama Polytechnic Institute, has been appointed Alabama farm products agent for the Tennessee Coal, Iron & R.R. Co., Birmingham.

• **D. D. Hamilton** has been appointed manager of the building materials section, tar products division, Koppers Co., Inc., Pittsburgh. **Thomas J. Battle** has been named assistant to Mr. Hamilton. Mr. Hamilton joined Koppers in 1925 and was made sales manager of the roofing division in 1930.

• **George Reed,** a metallurgical engineer with the Timken Roller Bearing Co., has been appointed sales engineer of the company's steel and tube division, with headquarters in Houston.

FREDERICK H. NORTON, vice-president, sales, American Car & Foundry Co.

• **Frederick H. Norton** has been appointed vice-president in charge of all sales for the American Car & Foundry Co., New York. Mr. Norton came to ACF in 1945 as an assistant vice-president in the sales department. He succeeds **R. A. Williams,** who has resigned as a director and vice-president in charge of sales to accept the presidency of the Standard Ry. Equipment Mfg. Co.

• **George Morlock** has been promoted from the position of general foreman of Kaiser Co., Inc. by-products operations at Fontana, Calif. to superintendent of the company-operated coke plant at Sunnyside, Utah.

• **James Wilson** has retired as manager of the field engineering section of the Allis-Chalmers Mfg. Co.'s steam turbine department, Milwaukee, after 43 years of service. **John R. Queen,** for the last 2 years Texrope sales representative in the Allis-Chalmers New York district office, has been named dealer supervisor at New York for the company's Empire region.

• **J. Carlton Ward, Jr.** has been elected chairman of the board of directors of the Fairchild Engine & Airplane Corp., New York. President of the corporation since 1940, he will continue as its chief executive officer. **Lawrence B. Richardson,** formerly vice-president of the Curtiss-Wright Corp., has been elected to succeed Mr. Ward as Fairchild president.

• **George P. Gradolf,** for many years vice-president and treasurer of the Cincinnati Bickford Tool Co., Cincinnati, has been elected chairman of the board and treasurer, and **Ozni E. Schauer** has been chosen president and general manager. Mr. Schauer has been employed by the company for 33 years and since 1935 has been secretary and works manager.

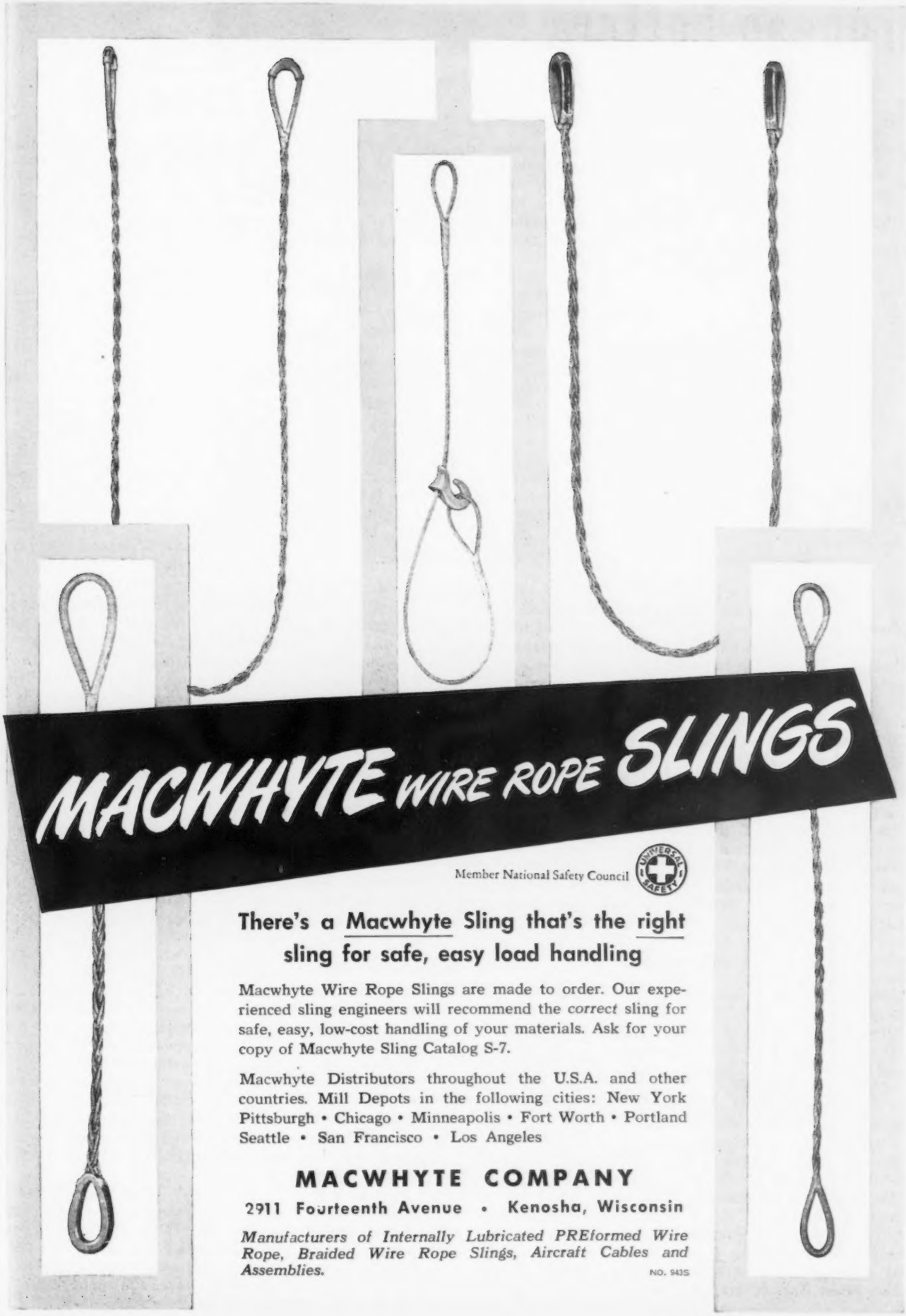
• **J. P. Vederko** has been promoted to general superintendent of the Cross Co., Detroit. He joined Cross in 1946 as liaison engineer after serving for over 7 years as superintendent of the machinery division of Ex-Cell-O Corp. **A. J. McLaren** has been appointed sales engineer in Ohio for the Cross Co. Mr. McLaren joined the engineering department of Cross in 1947.

• **Frank D. Atkins** has been named as representative for the management of Bethlehem Pacific Coast Steel Corp. at the Los Angeles plant. Mr. Atkins had held the same position at the company's Seattle works.

• **Albert B. O'Donnell,** sales manager, Arter Grinding Machine Co., Worcester, has been made a director of the company.

• **Jack A. Taylor** has been appointed sales promotion manager of Perfect Circle Corp., Hagerstown, Ind. He has been associated with the company for more than 15 years and has served as a district manager and a regional manager.

(CONTINUED ON PAGE 148)



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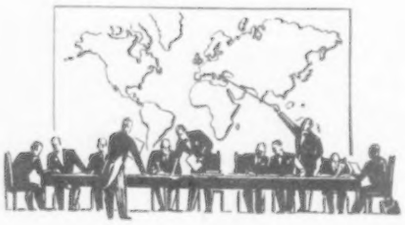
NO. 943S

European Letter . .

• Facts about Palestine are exerting their pressure in Washington . . . Partition can only be imposed by force . . . See no settlement in Palestine of any kind except by force.



LONDON — Slowly but inexorably the facts about Palestine are exerting their pressure in Washington. The fact that partition can be imposed only by force has been fought against for many wasted months, but it is now accepted. So, at last, is the fact that Britain will not obligingly supply the force.

If, therefore, partition is to go through, either the United States must itself provide the troops, or else it must face all the problems of creating an international army, which might have a Russian component and would certainly contain many Communists. Neither alternative is acceptable.

The United States has therefore abandoned partition and proposes instead that the United Nations should undertake a trusteeship for Palestine when Britain lays down the existing mandate, and maintain it until such time as the Arabs and Jews find a solution upon which they can agree.

The abandonment of partition represents an American concession to reality. The same can hardly be said of the proposal that the United Nations should take over the mandatory's task. The imposition of partition.

The Jews have prepared their plans for announcing the creation of a Jewish state on May 16—the day after Britain formally abandons the mandate—and the Arabs will continue to attack the state, whether or not a perplexed and helpless United Nations Commissioner sits in some heavily defended corner of the King David Hotel.

The only condition in which a trusteeship could now be maintained would be a readiness of the British government to keep their troops in Palestine and maintain internal security after May 15. There is no time to do anything else—so that new trusteeship is merely old mandate writ large. But Mr. Creech Jones has left the world in no doubt about Britain's determination to abandon sole responsibility for Palestine in May, whatever plan—partition, continued mandate, federation—is proposed to fill the vacuum.

IT is time surely to look at the situation in Palestine squarely, without reference to settlements by agreement, the extension of United Nations authority, the maintenance of the mandate or any other form of words designed to mask the ugly reality.

There can now be no settlement in Palestine of any kind except by force. When the British withdraw, the Arabs and Jews will fight it out. The only way of preventing a murderous war is to use external force to hold the combatants from each other's throats. That is the reality of Palestine—there is no other. And at the moment the likelihood of external force coming in to prevent the struggle is so remote that a fight to a standstill between Arabs and Jews in the Holy Land is the tragic prospect of 1948.

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Some observers are not too perturbed at this. They argue that the only way in which Arab and Jew can ever approach a settlement is for each side to be compelled, by the irrefutable evidence of war, to abandon its extremer claims. They believe that prolonged fighting will leave the Jews with a small area along the coast where their sovereignty will be unchallenged, while the Arabs will be in control everywhere else.

This situation will compel the Jews to abandon their claim to control all Palestine (and even more), while the Arabs may be persuaded to accept a partition they know they cannot overthrow by force. At that point, therefore, a settlement might be reached.

Anglo-American opinion is not likely to accept easily the cold-blooded realism of this approach. What has already happened in Palestine is proof enough of how pitiless and horrible the war between Arab and Jew would be, and anyone with a spark of humanity left in him will recoil horrified from the possibility that the Jewish people, already decimated by the Nazis and loaded with the persecution of centuries, should now, in the land they hoped to make their own, be exposed to new violence in a war they cannot win.

THIS purely disinterested and humane reaction is reinforced in the case of Britain and America by the realization that Palestine lies dangerously near the front line between Russian and Western interests in the Middle East and that nothing renders intervention so inviting or so possible as the existence of a bitter civil war. If there were any feasible alternative to accepting the arbitrament of war in Palestine, the Americans and the British would have the most compelling reasons for adopting it and carrying it out.

Is there such an alternative? In the past difficulty has lain not only in the division of opinion between Arab and Jew, but in the inability of the British and American governments to agree even in principle. President Truman's retreat from partition suggests that he has now abandoned the attempt to conduct American policy as though Palestine were a Zionist ward attached to New York State. But it gives no hint whether he has also abandoned the adjunct of partition—unlimited immigration for the Jews.

Insistence upon immigration and, in particular, upon the immediate admission of 100,000 Jews into Palestine, has proved a permanent obstacle to Anglo-American agreement even in principle.

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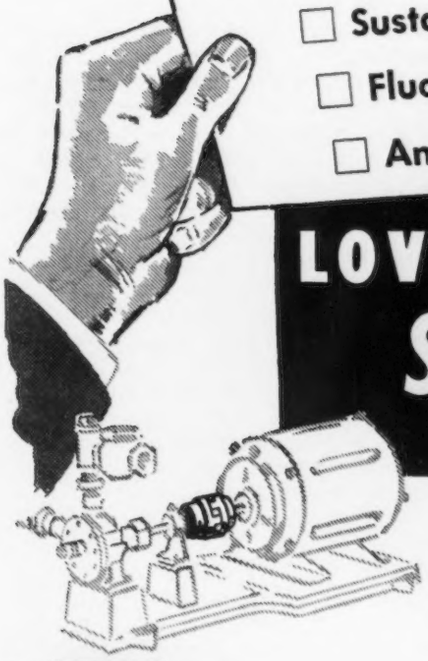

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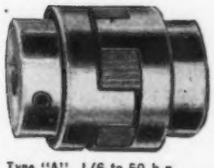

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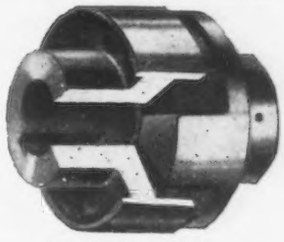

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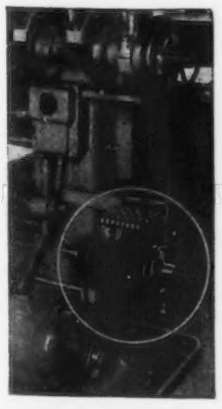

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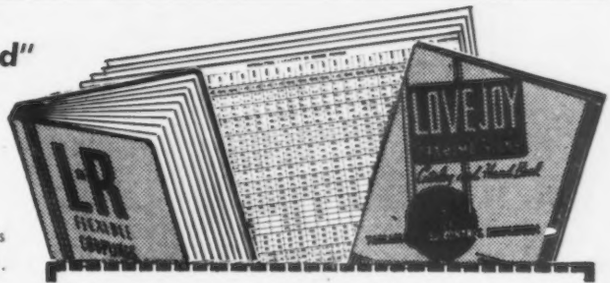

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Industrial News Summary...

- ***Mine Strike Effects Serious***
- ***Consumers to Feel Pinch Soon***
- ***Defense Hysteria on the Way***

THE moderate drop in steel ingot output in the past 2 weeks is by no means the indicator of total adverse effects of the coal shutdown. At a time when the steel industry should have been operating at close to 100 pct in order to speed domestic shipments, make plans for ERP and take in its stride the coming armament program, the ingot rate sagged to around 80 pct. No final figure will be available for another week, or until the coal issue is settled once and for all.

The drop in the output of pig iron is serious. It has, or will, hit foundries throughout the country. Steelmakers have had to take off blast furnaces because of the coke shortage. But, worse than this, needed pig iron for steel has been cut, shipments to large users such as auto firms have been drastically curtailed and foundries may see again the spectre of temporary shutdowns later this month or next.

As to the steel shortage because of the coal strike, the South, the Southwest and the West Coast have been hit much harder than the East. Those areas are the ones which could least stand the drop in steel supplies. Thus, once again, the Western and Southern customers will pay through the nose for months to come because of a coal strike.

Part of the blame for the laxity of handling the coal crisis must be laid at the door of the Administration. What the public did not know or failed to see, and what the Administration failed to prevent, was the loss of precious coal stocks which have had to be used to keep steel output where it has been for the past few weeks, despit the coal shutdown.

The gamble which many steel firms took, in an effort to keep their openhearths busy, was a rugged one. In the final stages it may be costly to coke ovens, blast furnace linings, scrap supplies and general maintenance. When the miners return to work steel mills can put equipment back into operation swiftly—in some cases. In other cases blast furnaces will have to come back slowly, or may even have to be relined because of the length of time they were out of blast. All this spells trouble in maintaining steel output later.

THIS week there are many reasons why steel supplies over the coming months will be anything but easier. They are:

(1) The ERP requirements will come sooner than had been expected. Figures for steel, pig iron and scrap to go to aid Europe are only tentative, but it seems clear that 2 to 3 million tons of finished steel per year will be shipped. The impact of this on domestic users will be heavy, even though the total amount of steel is not large in relation to total output.

(2) Freight car program is larger than a year ago. Commitments for steel to take care of 10,000 freight cars a month have been made—in addition to steel supplies for maintenance and repair. The latter item will not be small. This program will hit plate, sheet and bar distribution in no small way.

(3) While the armament program is not shaped up on a steel tonnage basis, not much imagination is needed to foresee that steel requirements on that program will get a green light over everything else. Past exprience reveals that much red tape will have to be unraveled before such requirements can enter the economy on a business-like basis—especially since neither the government nor the armed forces this week are certain what they will need.

(4) Feeling that they might be the first ones to get hit because of an armament program, auto makers will put terrific pressure on steel firms for deliveries as soon as possible and for as much as possible. They have not forgotten what the wartime requirements did to them. Furthermore, they have not forgotten what attitude the government took towards passenger cars when it looked as if they interfered with wartime needs. Today defense programs will be looked at with the same urgency as war needs were.

Within the next 30 days domestic steel users are bound to get a jolt when they are told what to expect in steel shipments for the third quarter. The loss of steel due to the coal fracas will then show up in less finished steel to consumers. Most finishing mills were running at full tilt in recent weeks but at the expense of necessary stocks of semi-finished steel ahead of the rolling mills.

If the present coal strike is stopped due to an 80-day cooling off period the steel industry has no assurance whatever that a walkout will not occur later in the year. The problem which must be settled is no easy matter. John L. Lewis is expected to throw every possible obstacle in the way of the administration and the coal operators until or unless he gets what he is after—a $100-a-month pension for all miners who have had 20 years service in the mines and are 60 years old, regardless of whether they are still in the mines or not.

It is the steel consumer who this weeks faces a steel supply condition which is becoming steadily worse. After 2½ years of hoping that steel supplies would be easier, he now runs into a situation that has the earmarks of the procurement-plagued past.

WITH all of these headaches the steel industry bids well to furnish its critics with plenty of so-called ammunition on the capacity problem. That old question is sure to pop up again this year and will make good material for use as a whipping boy for any and all reasons. Unless the industry has clear cut answers and arguments on why there is a shortage of steel 2½ years after the war—when other shortages are more or less cleared up—they are in for a public beating. The real facts are that, since the war the industry has faced five coal strike crises, a major steelworkers' strike, numerous setbacks due to weather and other unforeseen reasons and a general wearing out of equipment—all of which lost millions of tons of steel.

• **STEEL WAGE TALKS**—On Apr. 1 United Steelworkers of America, CIO, mailed registered letters to about 600 steel firms, asking for a "substantial wage increase". In addition to wages the steel workers are prepared to request negotiation of a social insurance program, to be paid entirely by the industry. The union is expected to use cost-of-living figures to back up its proposals, at the same time arguing that further steel price increases would not be necessary to pay the freight. Industry arguements are expected to cite rising costs and to maintain that higher wages would necessitate higher steel prices.

• **FREIGHT CARS**—Following its approval in virtually the same form in which it was carried on by ODT, the OIC has forwarded to cooperating firms its plan for voluntary allocation of steel for monthly construction of 10,000 freight cars for domestic use. Under the program, 250,000 tons of steel per month will be provided for repair, maintenance and new construction. Reversing its previous stand, the OIC now believes current shipments of pig iron to the industry are sufficient and says it contemplates no formal allocations in the near future.

• **ITALIAN PROGRESS**—Production of motor vehicles in Italy made steady progress last year and reached a monthly average of 3487 units, against 2402 in 1946 and 5746 in 1939. Peak month last year was October, when production was 4845 vehicles, of which 3229 were cars, 211 buses, and the rest trucks.

• **OIL SHORTAGE**—The United States will most likely have to import over 500,00 bbl of oil a day by 1951, cacording to S. A. Swensrud, Gulf Oil Co. executive vicepresident. He predicted that by 1955 this country would probably require net imports of upwards of a million bbl per day. We can expect about half or less of this from South America—the rest in all probability will have to come from the Middle East, Mr. Swensrud declared. Because of the staggering cost the oilman saw little possibility of synthetic plants making any substantial contribution to the million bbl a day shortage by 1955.

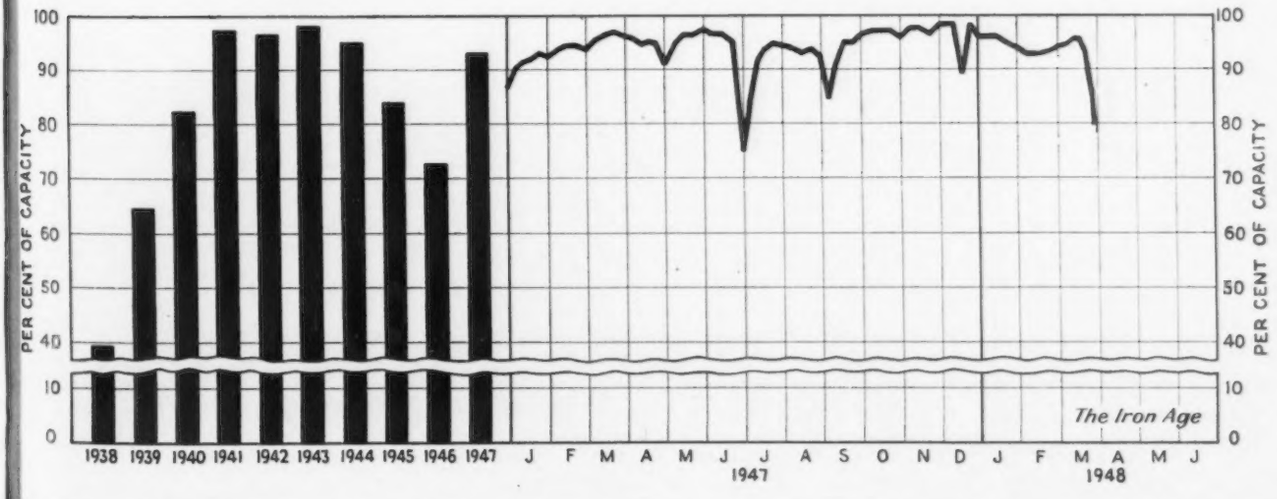
• **WAREHOUSEMEN INVITED**—Representatives of the Steel warehousing and jobbing industry have been invited to meet with Dept. of Commerce officials in Washington, Apr. 21. The meeting has been called to consider the part that the steel warehousing and jobbing industries might play in breaking bottlenecks to increased production by directing some of their present supplies of steel to participants in voluntary agreement programs, OIC said, rather than to discuss questions concerning supplies of steel products that warehousers and jobbers are now receiving from steel mills. Representatives invited to attend the meeting will include members of the Steel Warehouse Assn., Assn. of Steel Distributors of New York City, National Wholesale Hardware Assn. and the Steel Distributors Institute of New York City.

• **ORE IMPORTERS FOILED**—Importers of iron ore whose activities have been curtailed by current high ocean freight rates have been wistfully eyeing the suggestion of a $2 to $3 a ton increase in domestic prices which would permit them to bring in ore at a profit. The announcement of the 65¢ ore increase is expected to dampen their enthusiasm for competing in this market.

• **BUILDING COSTS**—The Austin index of industrial building costs advanced three points to 168 during the first quarter of 1948, reflecting the continued upward trend in building material prices and wage rates. George A. Bryant, president of Austin Co., pointed out that the index, which is computed by applying base rates and prices in representative localities to a typical factory structure, only reflects a part of the actual increase which has taken place since the first of the year.

• **PRICE POLL**—Reaction of industrial purchasing agents to the recent steel price fiasco is revealed in the announced results of a poll of 1000 purchasing agents by "Purchasing Magazine." Results showed 85 pct consider the rise a normal price-cost adjustment. At the same time, 32 pct, when asked if they believed it to be a strong inflationary factor heralding a general price upturn, answered "yes".

Steel Ingot Production by Districts and Per Cent of Capacity



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6	83.0	94.0	75.0	77.0	90.0	67.0	80.0	46.0	102.0	79.0	96.0	77.5	80.0	81.5**

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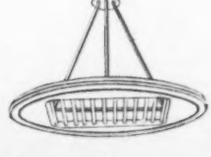

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"Where Is All The Steel Coming From", Ask Worried Consumers

New York

• • • **Two dramatic events have** changed the 1948 steel supply outlook for consumers in this country. These two events are (1) a sudden, strong and farflung feeling that Congress will authorize substantial increases in armament expenditures, and (2) John L. Lewis' explosion of the dream of 90 million tons of steel production for this year.

If rearmament psychology in this country had needed a boost, it was forthcoming in the President's stern call to arms. If the prophets of failing steel demand needed to revise their thinking by reviewing steel commitments which have already been made for this year, John L. Lewis, by a single stroke, forced them to do so.

At the same time steel needs for 1948 are being revised upward, anticipated steel production figures are being revised downward. The logical question which steel consumers are beginning to ask themselves and others is, "Where are we going to get all this steel?" The triple impetus of allocation, European Recovery Program and defense requirements appears to have shifted the ratio of supply and demand before a balance was ever achieved.

A brief resume of the steel requirements for the voluntary allocations program looks something like this:

Freight Cars—In spite of government - industry cooperation, builders have at no time been able to attain the goal of 10,000 cars per month. Secretary Harriman has so far been able to resist pressure to up the goal to 15,000 cars. Builders are this year slated to receive about the same or slightly more steel than last year.

Agricultural—Primary aim of this program is to produce more essential food. This program rates high on government agenda of favored industries. Steel requirements fully equal to last year's will be backed by government pressure.

Oil and Gas—Steel requirements for oil and gas pipelines will be substantially greater than last year. Requests will be pared as much as possible. But severe shortage of oil and gas transport, along with its constrictive effect on industry last winter, has supplied top-notch ammunition to arguments for more steel.

Defense Plans And Coal Strike Make Catch-As-Catch-Can Procurement Last

o o o

By BILL PACKARD
Associate Editor

o o o

Construction—Government estimates on 1948 construction indicate a 20 pct increase over 1947. On the basis of these estimates, about 6 to 8 million tons of steel will be needed for construction (THE IRON AGE, Mar. 18, p. 107). Despite critical need for low-cost housing, allocation progress has been slowed by the tremendous task of translating home shortages in all parts of the country into tons of steel.

The advent of ERP will bring about a revision of the steel export picture. The United States exported about 6.5 million tons of steel last year. Of this amount, only 4.5 million tons were exported by producers. A large part of the remaining 2 million tons was exported at prices ranging as high as $400 a ton.

The present export licensing program of Commerce Dept.'s Office of International Trade will divert high priced export steel into the ERP stream. If this program is highly successful, about 500,000 tons more steel will be needed for

The Fall Guy — What! Again?

export this year—although foreign consumers of high priced steel will be caught in the squeeze. If the program is not successful, the additional tonnage needed for export will be considerably greater.

The amount of additional steel needed for defense requirements can not be determined at the present time. However, indications are that it will be sizeable. The important point is that this large, extra commitment, which will be thrust on the steel industry, was not included when 1948 plans were made. Nor did 1948 plans take into account the constrictive effect of a coal strike.

The coal strike has dealt a severe blow to the steel industry, as well as to consumers of steel products. While the steel tonnage lost because of the strike is substantial, it would have been far greater if steel producers had not been protected by large coal stockpiles. By using these stockpiles, producers were able to keep the ingot rate from plummeting at the inception of the strike.

But these valuable coal stockpiles have now been almost depleted. If the coal miners and operators do not settle their differences, there is the threat of another, and far more disastrous, coal strike in July—at the end of the 80-day cooling-off period. Steel consumers who are already jittery over possible armament orders and government controls over steel, and who, in many cases, speak of them as foregone conclusions, would then have a headache to blot out all others.

Probably the most worried steel consumers are the automobile manufacturers. And they have reason. They know that an armament program would require substantial tonnages of low-grade alloy steel bars, which they fear would be diverted from Detroit auto plants. Nor are they blind to the fact that deliveries on openhearth alloy bars have slowed from 3 to 4 weeks early this year to 3 to 4 months at the present time.

Another straw in the wind is the higher operating rate of high-cost electric furnaces. Although current rising operations are based largely on conversion of carbon ingots, major normal product of the electric furnace is high-grade alloy steel of the type used in aircraft manufacture.

Steel consumers who feel that armament orders and government controls pose real threats to their present steel supplies have already struggled through 2 years of catch-as-catch-can steel procurement. Many of them have worked out their procurement problems with a fair degree of success. But most of them are still operating on a hand-to-mouth basis. They report that their steel inventories are not large.

To convince these consumers that demand for steel is falling off would be a herculean task. To them, the triple impetus of allocation, ERP and defense requirements on the one hand, and the crippling effect of a ruptured coal supply on the other, mean procurement battles for a long time to come.

It is no wonder they are asking, "Where are we going to get the steel?" For that matter, who can answer that question?

Rules Striking Foremen Should Be Reinstated

Washington

• • • **A ruling that** 82 foremen, discharged at the Gary works of Carnegie-Illinois during the 1946 steel strike, should be reinstated with back pay was rendered Mar. 30 by an NLRB trial examiner. The action becomes final in 20 days unless exceptions are filed with the board.

The foremen had refused to take over rank and file jobs when the company and USW could not agree on which workers should stay on the job as a maintenance force. The ruling held that the foremen were discharged as the result of an unfair labor practice prior to amendment of the labor act last year and that therefore foremen were protected as to engagement in union activities.

Iron Powders Increase

Painesville, Ohio

• • • **Increased prices of** electrolytic iron powders effective Apr. 1 have been announced by Buel Metals Co. Annealed powders selling in ton lots at 17¢ per lb. have been advanced to 19.5¢. The grade which formerly sold at 21¢ is now 23.5¢. The same grades in 20 ton lots are now sold at 17.4¢ and 21¢, respectively. Prices are f.o.b. Painesville.

Buel is now offering a new low-cost hydrogen reduced iron powder, 98+pct Fe, minus 80 mesh, at 11¢ per lb in ton lots, 9.25¢ in 20 ton lots. The company is offering 50-50 blends of the hydrogen reduced powder with its electrolytic powders at 15.25¢ per lb in ton lots. The blended powder is designed to provide the higher green strength of the reduced iron powder with the greater sintered toughness of the electrolytic powders.

AMERICAN IRON AND STEEL INSTITUTE — **Blast Furnace Capacity and Production—Net Tons** — **FEBRUARY - 1948**

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total		Percent of capacity	
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Current month	Year to date
Distribution by Districts:										
Eastern	11	13,093,560	908,676	1,866,950	25,498	54,564	934,174	1,921,514	90.1	89.5
Pittsburgh-Youngstown	17	25,588,120	1,860,348	3,905,532	25,364	53,846	1,885,712	3,959,378	93.1	94.4
Cleveland-Detroit	6	6,495,000	469,503	964,353	-	-	469,503	964,353	91.3	90.6
Chicago	7	14,700,290	972,352	2,004,870	-	-	972,352	2,004,870	83.5	83.2
Southern	8	4,949,660	370,051x	756,099	7,313	x 17,441	377,364	x 773,540	96.3	95.3
Western	3	2,612,300	198,927	410,135	-	-	198,927	410,135	96.2	95.8
Total	35	67,438,930	4,779,857	x9,907,939	58,175	x 125,851	4,838,032	x10,033,790	90.6	90.8

Group Backing Strong Government Steel Controls Gaining Support

Washington

• • • **The minority view that** "there's nothing wrong with the steel industry that more government controls won't cure" gained support last week.

Critics of the industry feel that transactions exposed by the gray market investigating committee headed by Rep. Macy, R., N. Y., definitely have furthered the case for increased federal regulation.

Mr. Macy's group believes that the spotlight of publicity on such practices as tie-in-sales, $350-a-ton sheet steel, and selling to known gray market operators will go a long way toward eliminating such transactions. The probers are correct—to a certain extent—but they also unwittingly further the case for regulation.

Needless to say, some of the good-will gained by the big producers in their statements of refusal to sell to gray market operators is wiped out when the vice-president in charge of a smaller mill publicly states his company has not adopted such a policy.

Rep. Macy named two producing mills—Portsmouth Steel Co. and Newport Rolling Mill—as contributing to "indefensible" practices which "contribute materially to the inflated cost of living." Something obviously is wrong, he declared, when a legitimate end-user of steel is forced to pay $350 per ton for sheets in order to keep from closing his doors.

The investigating group, in two days of public hearings, questioned almost a score of witnesses in tracing the course of two "typical" gray market transactions. The first of these two deals, involving the Portsmouth Steel Co. came about this way:

The Holland Furnace Co., of Holland, Mich., needed sheets. Kaiser-Frazer Corp., of Willow Run, Mich., located 20 miles away, had sheets to sell. At the end of an involved transaction, a trucker moved the sheets 20 miles down the road.

But meanwhile K-F sold the sheets and scrap aluminum in a package deal for Charles A. Koons, New York City broker, who unloaded the aluminum at a loss to Alcoa and sold the sheets to Charles A. Foster, Cleveland broker, who resold them to Robert A. Baker, another Cleveland broker, who resold them to Albert F. Reilly, Detroit broker, who resold them to Louis Golden, another Detroit broker, who resold them to Holland Furnace. The price of approximately $120 a ton at K-F had increased to approximately $350 a ton to Holland Furnace.

Gray Market Hearings Cause Some Resentment Against All Steel Companies

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Rep. Macy accused the traders involved of attempting to defend themselves by 'ingenious argumentation." These dealings, he warned, "contribute materially to the inflated cost of living and reach deeply into the pockets of the people who are already hard put to keep their heads above water in providing themselves with things essential to a decent mode of living."

In the second transaction, committee members were critical of steel sales policies of International Detrola Corp., of Detroit. I-D sold 3000 tons of sheets to Clark, White & Co., of Boston, in a tie-in deal that included $400,000 worth of table-model radio receivers. Although Russell Feldmann, I-D president, declared he "would fire anyone I caught selling at above the mill price," he added that I-D "could not police every sale it makes."

John T. M. Reddan, committee counsel, criticized Mr. Feldmann for the tie-in transaction. "You know they (Clark, White & Co.) would take a loss on the radios and would have to sell the steel at a premium price in order to recoup the loss," he told the witness.

"That's-their business," Mr. Feldmann snapped.

Capitol Hill observers, noting that 1948 certainly has not yet proved to be steel's year in Washington, believe that the correllary of the increased-control theory may well be "there's nothing wrong with the steel industry that better public relations won't help."

GOING FAST: This coal stockpile at the Carnegie-Illinois Steel Corp. coke plant at Clairton, Pa., had shrunk to one-fourth of its 350,000 ton capacity when this photo was taken Mar. 30. Some in the industry report the large stocks of coal which they had at the beginning of the miners' strike nearly exhausted.

Industrial Briefs . . .

• BUYS MINE — Jones & Laughlin Steel Corp. has purchased Darr Smokeless Coal Co., with a mine at Twin Branch, W. Va. The coal, located in Wyoming and McDowell Counties is estimated at approximately 10 million tons. J & L expects to produce 1700 tons a day when full mechanization is completed.

• NEW ROLLING MILL—The Aluminum Co. of America has announced that it is using more than 6¼ million lb of aluminum in the construction of its nearly-completed Davenport sheet and plate rolling mill.

• BUILDING PLANT — The Carborundum Co. has announced that construction has started for building no. 2 at their Wheatfield, N. Y., plant which will house the Coated Products Div. The new building will be ready for occupancy in September.

• SALES OFFICE—Link-Belt Co. Atlanta plant established a district sales office in Jacksonville, Fla. Robert L. Lowder has been appointed district sales manager in charge of the new office.

• MOVES — Cutler-Hammer, Inc., Milwaukee, has announced new quarters for their Atlanta district sales office at 714 Spring Street, N.W.

• CHANGES HANDS — The Diamond Machine Co., Philadelphia, has been purchased from American Engineering Co. by the Bridgeport-Diamond Machine Co. Engineering and sales offices will be at 2362 Main St., Stratford, Conn., with John T. Kilbride as president.

• PURCHASE — The Buffalo Stainless Casting Corp. has purchased the idle foundry and machine shop of the Otis Elevator Co. and plans to begin production in the near future.

• COAL CLEANING PLANT —Westinghouse has been awarded a contract to furnish all the major electrical equipment for a coal cleaning plant to be built by the Jones & Laughlin Steel Corp. to serve its no. 4 and no. 5 coal mines at Vestaburg, Pa. The plant is designed to produce 18,000 tons of washed coal daily.

• TESTING LABORATORY— A new laboratory building for studying pilot castings and developing the most suitable foundry techniques for all types of jobs is now in full operation at Michiana Products Corp., Michigan City, Ind.

• DOUBLES CAPACITY— Brace-Mueller-Huntley, Inc. Buffalo, warehouse distributor of steel and aluminum products, has opened a $250,000 addition to its facilities which doubled warehouse capacity.

• BUYS ENGINE PLANT— Announcement has been made of the purchase by the Tucker Corp. of Chicago of Aircooled Motors, Inc., Syracuse, N. Y., manufacturers of Franklin aircraft engines, for the sum of $1,800,000. Full production of aircraft engines will be continued at the Aircooled plant.

• NEW ENGLAND SALES— The New England sales and service headquarters for all machinery manufactured by E. W. Bliss Co. will now be handled from the New Haven office, 129 Church St., New Haven, it was announced recently.

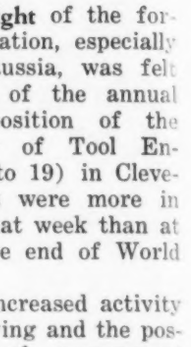
• HEADQUARTERS — SKF Industries, Inc., has announced that its branch office at Charlotte, N. C., will become district headquarters with a territory embracing all of North and South Carolina, southern Virginia, eastern Tennessee and northern Georgia.

ASTE Places Emphasis On More Production While Cutting Cost

Cleveland

• • • **The full weight** of the foreign relations situation, especially with regard to Russia, was felt during the week of the annual meeting and exposition of the American Society of Tool Engineers (Mar. 15 to 19) in Cleveland. War jitters were more in evidence during that week than at any time since the end of World War II.

Indications of increased activity in government buying and the possible expansion of government contracts involving war materials further intensified this feeling.



I. F. Holland

The show, held at Cleveland public auditorium, drew more than 30,000, with exhibits totaling close to 300. Along with the exhibition last fall in Chicago by the National Machine Tool Builders Assn., the ASTE show completed the picture of plant tooling. The NMTBA exhibition showed the machines available to American industry, while the ASTE show emphasised most effective use of these machines by American industry in increasing production and cutting costs.

At the annual banquet, I. F. Holland was elected president of ASTE for the coming year; R. B. Douglas was elected first vice-president; H. L. Tigges was elected second vice-president; and V. H. Ericson was elected third vice-president. George A. Goodwin was elected treasurer and William B. McClellan was elected secretary.

February Wages Down

Washington

• • • **Although February** average hourly earnings remained unchanged from $1.287 for production workers, bad weather and fuel shortages reduced average weekly earnings to $51.52 for the month from January's $52.17 and the December peak of $52.73. The February work-week dropped a half-hour to 40 hrs.

Steel "Daisy Chain" Is Held at Both Ends By a Steel Consumer

Detroit

• • • **A steel "daisy chain"** invariably has a steel consumer holding up both ends of the chain.

This conclusion, long held by those familiar with the inner workings of the steel gray market, is substantiated by the testimony given this week in Washington by Clay P. Bedford, Kaiser-Frazer vice-president and C. Russell Feldmann, president of International Detrola Corp., in the opinion of prominent Detroit steel buyers.

See p. 121 for Washington report on gray market—Ed.

According to informed sources here, the broad outline of Kaiser-Frazer's extensive steel trading activities has been evident for several months. However, the tie-in deals by which K-F was able to recoup $187,560 of its investment in tools for its stillborn front-wheel-drive car and at the same time liquidate its surplus aluminum stock has turned out to be something of a bombshell, particularly to auto producers who have on several occasions traded commodities with the Willow Run car manufacturer.

As one observer here pointed out to THE IRON AGE, Kaiser-Frazer had a surplus of steel it was entitled to sell at a *fair price*. If the surplus steel had been obtained from established steel suppliers, K-F would have been obligated to return the steel for full credit. Failure to do so would undoubtedly have resulted in shutting off its steel supply. By tieing in the steel sale to the sale of surplus tools and aluminum K-F in effect created an artificial high price for the steel, in his opinion.

After the steel had passed through the hands of several brokers the original price was multiplied more than three times. Directly or indirectly, this source argued, Kaiser-Frazer undoubtedly contributed in no small way to the boost in premium priced steel.

"I am not saying," this commentator continued, "that Kaiser-Frazer took any greater advantage of its situation than other steel consumers would have who happened to have surplus steel. The same story is being repeated many times every day — with amazing variation —," he continued. "But in view of the evidence that is piling up, it would be difficult to deny that steel consumers invariably originate — as well as support—the sky high prices for marginal steel."

Other sources here have called attention to the fact that failure to dispose of steel surpluses through what they call "reliable broker channels" may have a tremendously inflationary effect on gray market steel prices. The Kaiser-Frazer testimony brought out that one lot of K-F steel changed hands six times on paper before the steel left the Willow Run plant.

A steel buyer here has argued that multiple brokerage is the basis for most of what he calls the "fizz" in gray market steel prices.

"The little fellow unable to obtain steel from his regular suppliers," one buyer told IRON AGE, "often has no other course but to utilize new and costly channels to obtain badly needed steel. If those entrusted to manage these subsidized steel facilities fail to meet their responsibilities in an approved manner, they richly deserve the criticism they are getting even though their activities may be entirely legal."

Gray Market Accusations Stir Detroit Big Wigs Who Nod "I Told You So"

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By WALTER G. PATTON
Detroit Regional Editor

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50 YEARS AGO

THE IRON AGE, *April 7, 1898*

• "The plant of the Walclark Wire Co., Elizabethport, N. J., is interesting not alone in the fact that it represents modern practice in rolling and drawing copper wire but because the first installation of roller bearings in rolling mill work has been made here. The finishing mill is equipped with roller bearings throughout and consists of six stands of three-high, 9-in. rolls. The introduction of roller bearings, which were designed by the Mossberg & Granville Mfg. Co., constitutes a distinct advance in rolling mill machinery of this type and it is highly probable that before long such bearings will be introduced in heavier work."

• **"Arrangements are being made to bring the German-American Steel Ball Co. now located at Schweinfurt, Bavaria, to Allentown, Pa. This is one of the largest steel ball factories in Europe."**

• "A self-locking steel nut which is claimed to lock itself on the bolt when tightened has been introduced by National Elastic Nut Co., Milwaukee."

• **"In a recent motor carriage race between Marseilles and Nice in France, the winning vehicle, a Panhard two-seated carriage fitted with a 6-hp motor, made the distance of 156 miles at an average speed of 22¾ mph."**

• "In a general way, it has long been known that the degree of inflation of bicycle tires affects the work required for propulsion. Some experiments for investigating this matter quantitatively have been made by the Pope Mfg. Co. It is interesting to learn that, within ordinary limits, the popular belief is correct that the more air there is in the tire, the easier the bicycle runs."

ERP Program to Hit Industry Sooner Than Had Been Expected

Washington

• • • **Fast action** by the administration this week in getting the new foreign aid program into motion means that industry will feel the effects of the first year's 6 billion buying program earlier than anticipated.

The State Dept., which is handling administration of the program pending creation of a new agency, said that negotiations for steel procurement had begun and that signing of the first contracts was expected "very soon."

Meanwhile, the relief planners have placed highest priority on procurement contracts covering food, petroleum, fertilizer and cotton. Shipments of these commodities are scheduled to begin as soon as the participating nations sign documents certifying their intent to cooperate in the program.

An emergency fund of $1 billion, held by the Reconstruction Finance Corp., is expected to finance the buying program in this country until the full $6 billion is appropriated by Congress. Actual voting of the funds may not come for another 6 to 8 weeks.

Procurement Negotiations Are Underway; Contracts Are Expected Shortly

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By GEORGE BAKER

Washington Bureau

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"We've got to keep the essential things moving in the first few weeks," one official said. "All procurement will be 100 pct through private channels. As soon as we get the emergency supplies moving, we'll concentrate on signing contracts for iron and steel goods."

As long as the aid program remains under State Dept. control, actual procurement will be handled by the Treasury's Bureau of Federal Supply THE IRON AGE, Sept. 11, 1947, p. 208). Once the program is shifted to the official administering agency—Economic Cooperation Administration—the bulk of the buying will be done directly by representatives of the recipient nations in direct dealings with U.S. firms.

Congress has estimated that about $325 million worth of iron and steel items will be imported by the recipient countries from all sources in the first 12 months of the program. This figure includes $154.9 million worth to be shipped from or financed by the U. S. and is broken down as follows: Finished steel, 1,066,000 tons; crude and semifinished, 369,000 tons; pig iron, 38,000 tons; scrap, 55,000 tons and iron ore, 1,443,000 tons.

Aside from procurement activities, administration planners also are turning attention to plans for importing critically needed materials to the U. S. Language of the aid act permits the participating countries to limit such exports to the U. S. to "reasonable limits" in order not to unduly dilute their dollar balances.

Neither is any specific provision made for imports of scrap to the U. S., except that the act spells out that scrap imports are for immediate use, and not for stockpiling, as is the case for the other imports of materials in short supply here.

The administering agency—Economic Cooperation Administration—is still in the blueprint stage at the White House and in the agencies. The total $6,098,000,000 pie is earmarked by Congress for ECA to cut into four pieces: European Recovery, $5.3 billion; military aid to Greece and Turkey, $275 million; economic aid to China, $125 million and United Nations children's fund, $60 milion.

Other features of the ECA program of interest to business are the provision requiring Secretary Marshall to seek an end to dismantling of plants in Western Germany and the setting aside of $1 billion for loans and guarantees to private industry. The guarantees would would permit U. S. businessmen to convert proceeds from new European investments into dollars. A total of $700 million is provided for loans and $300 million is set aside for guarantees.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

5085 **Tons,** Chesapeake City, Md., Chesapeake and Delaware River bridge, U. S. Army Corps of Engineers, to American Bridge Co., Pittsburgh.

2445 **Tons,** Huntington County, Pa., bridge over Juniata River, to Bethlehem Steel Co., Bethlehem.

1640 **Tons,** Warren Pa., Pennsylvania Railroad bridge over Allegheny River, to American Bridge Co., Pittsburgh.

1600 **Tons,** Wheatfield, N. Y., factory building for Carborundum Co., to Bethlehem Steel Co., Bethlehem, by A. L. Jackson, Chicago.

880 **Tons,** Forty Fort, Pa., warehouse for American Stores, Inc., to Lehigh Structural Steel Co., Allentown, Pa.

700 **Tons,** Whjteside County, Ill., bridge section F, to Bethlehem Steel, Bethlehem.

450 **Tons,** Camden County, N. J., two bridges, N. J. Dept. of Highways, F. A. Canuso & Sons, contractor, to Bethlehem Steel Co., Bethlehem.

350 **Tons,** Clay County, Ill., state highway bridge section 18F, to Midland Structural Steel Co.

300 **Tons,** Chester, Pa., garage for Southern Penn Bus Co., to Bethlehem Steel Co., Bethlehem.

180 **Tons,** Camden, N. J., transfer bridge for Pennsylvania R.R., to American Bridge Co., Pittsburgh.

• • • **Reinforcing bar inquiries** this week included the following:

1200 **Tons,** Chicago, Paulina and Princeton St. sewer.

150 **Tons,** Hinsdale, Ill., sanitarium building.

• • • **Reinforcing bar awards** this week included the following:

700 **Tons,** Wandum, Pa., 24 storage silos for Medusa Portland Cement Co. to McDonald Engineering Co., Chicago.

400 **Tons,** Chicago, Sinai Temple to Wendnagel & Sons.

400 **Tons,** Omaha, Neb., flood wall through Parsons Construction Co., to Sheffield Steel Co.

350 **Tons,** Sioux City, Neb., auditorium to Gates City Iron Works.

300 **Tons,** Minneapolis, Federal Loan Bldg., through Madson Construction Co., to Ceco Steel Products.

185 **Tons,** Chicago, building for Garden City Envelope Co. to Wendnagel & Sons.

135 **Tons,** East St. Louis, Ill., Illinois Farm Supply fertilizer plant through James Stewart Co., Inc., to Laclede Steel, St. Louis.

• • • **Piling awards** this week included the following:

1800 **Tons,** Omaha, Neb., flood wall through Parsons Construction Co., to Bethlehem Steel Co., Bethlehem.

• • • **Plate awards** this week include dthe following:

120 **Tons,** Hirsch-Spur, Mont., catalytic cracking towers for Carter Oil through A. M. Castle Co.

Weekly Gallup Polls . . .

Majority in Holland Support the European Recovery Plan

Princeton, N. J.

• • • **Except for members** of the Communist Party, the majority of the people of Holland welcome the Marshall Plan. However, in Holland as in France, England and Italy a substantial number of people think the main American motive for the Marshall Plan is to create markets and stave off a depression, according to George Gallup, director, American Institute of Public Opinion.

This fact, revealed in surveys by Gallup Poll affiliates overseas, brings out a marked contrast between opinion here in the United States and opinion abroad.

Here in the United States only a very small percentage of voters—fewer than one in ten—think there will be a depression within a year. But in Holland, France, England and Italy a very much larger proportion—ranging from about one-fifth to more than one third—seem to feel that a business crisis is close enough at hand in the United States to make us want to adopt the European Recovery Plan as an economic "shot in the arm." It is quite evident that the American people and the people in Europe have a different set of impressions about the American economy.

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The Dutch poll was conducted by the Nederlandsch Institut voor de Publieke Opinie, one of the 12 members of the International Assn. of Public Opinion Institutes. The Dutch poll found that nearly nine out of every ten voters in Holland have heard about the Marshall Plan and these were asked:

"Do you think our country should cooperate in the plan or not?"

The vote:

	Pct
Yes, cooperate	59
No, do not	9
No opinion	32

When asked to give reasons for their opinion, those in favor said that ERP is an economic necessity for Netherlands recovery, and that it will bolster the forces opposed to Communism. Dutch voters against ERP said that it will make Holland too dependent on the United States.

When opinion was analyzed by political parties, it was found that the members of all Dutch parties except the Communists are in favor of ERP by majorities ranging from 58 to 88 pct. The Communist vote is only 8 pct in favor, 75 pct opposed and 17 pct no opinion.

•

The next question asked:

"Why do you think the United States wants to give us the Marshall Plan help?"

The principal replies were:

	Pct
U. S. wants markets, needs to stave off depression	38
To stop Communism, Russia	15
To help Europe	10
To get more power, imperialism	7
Miscellaneous and no opinion	30

Polls in January by the British, French and Italian public opinion institutes found that majorities ranging from 60 to 65 pct in the three countries were in favor of ERP. When asked to give their opinions as to why the United States had proposed the plan, the people of the three nations voted as follows:

	Eng. Pct	France Pct	Italy Pct
To help Europe	24	23	35
U.S. wants markets, stave off depression	22	26	17
To stop Communism	14	14	20
Imperialism	8	9	11
Miscellaneous	6	7	18
No opinion	26	21	17

•

The estimates of the American people about the possibility of a depression here were gathered by the American Institute of Public Opinion early this month.

Belief That United States Fears Depression Differs Widely From American Views

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"Do you think there will be a serious business depression in the United States this year?"

Poll in U. S.:

	Pct
No	72
Yes	9
No opinion	19

When asked whether a depression is likely within 2 years, the country voted: no 52 pct, yes 25 pct, and no opinion 23 pct.

•

Danish public opinion leans toward the United States and the Western powers in the current disputes with Russia.

A nationwide poll by the Dansk Gallup Institutet of Copenhagen, member of the 12-nation International Assn. of Public Opinion (Gallup) Institutes, shows the following:

"Which foreign policy do you think Denmark should follow during the present state of affairs between East and West. Do you think Denmark ought not to take sides, or should the country actively join one of the sides?"

	Pct
Take sides	46
Stay neutral	32
No opinion	22

Those who said "take sides" were asked: "Which side do you choose?"

	Pct
Join Western powers	95
Stay neutral	3
No opinion	2

MACHINE TOOLS

. . . News and Market Activities

Reports Show Tool Producers May Be Under Priority Setup Soon

• • • **Machine tool** producers may find themselves within the next 90 days operating under a priority setup similar to that operating during World War II.

THE IRON AGE has learned that several machine tool orders have been placed within the last 30 days carrying "riders" which are in effect government priorities for purchasing machine tools that may be required on U. S. Navy contracts. It is understood the rider may accompany the order or it may be sent through several weeks after the order is placed with the machine tool supplier.

Machine tool sources are being instructed to attach the rider to the purchase order. The rider also carries the end use of the product and the government contract number. No evidence is available to show that riders have ben used extensively, although informed sources believe that if machine tool history repeats itself, an increasing number of government orders may "request" preferential treatment.

Reports of a revival of the priority setup for machine tools come at a time when war talk pervades all industry. It is known that top government officials have been recent visitors at large industrial plants in Detroit and other cities to determine the potential of these plants in event of war.

"We are cooperating with these agencies 100 pct," one source told THE IRON AGE. "Naturally, in event of hostilities we want to avoid all the confusion that preceded our activities during World War II."

The concensus of machine tool producers and distributors is that while they are anxious to avoid a return of any setup resembling the priority system in effect during the last war, they are making every effort to cooperate voluntarily with governmental agencies.

In Detroit a survey of machine tool suppliers indicates that inquiries are currently outdistancing

During Past 30 Days Navy Has Laid First Groundwork For Its Priorities

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orders by a substantial margin. While standard tool movements are reported to be slow, considerable interest has been reported in semi-transfer type machines which can be delivered within a comparatively short time.

During the past week several orders for equipment have been placed for the new Reo truck program. There has also been some tooling activity by two General Motors divisions.

Definite commitments for the Dodge tooling program have been made, it is reported, and inquiries are out for production equipment for Chevrolet Gear & Axle.

As anticipated, hold-ups have been issued for tooling that would have been required to increase Kaiser-Frazer production to 1500 units per day. It is understood,however, that orders for new K-F production equipment will be carried out according to original planning.

Small tool and die shops in this area are quiet at the moment, although recent ordering by Fisher Body of new dies for postwar GM models should result in increased tempo in the near future. It is reported that a considerable amount of work for Fisher, in addition to Chrysler dies, are now in process in Detroit foundries.

In other sectors, second quarter outlook for the machine tool industry is gloomy, particularly for the next 60 days, despite rumors of a military preparedness program and inclusion of $22 million in new foreign firm orders under the Marshall Plan.

Reports indicate that the bulk of the machine tool builders have not received any current business from sources that point particularly to war.

March was a fairly good month, following the February lull, when business fell off to 40 pct or 50 pct of December and January levels, but domestic buying is keeping the industry going at the present time.

Foreign business has fallen off to practically nothing, and one of the major producers in the Cleveland area told THE IRON AGE last week that he did not receive one new foreign order in March—the first month in the past 10 years in which he did not get some foreign business.

According to industry sources, it is possible and even likely that European buyers are withholding business in the hope of getting machine tools under the Marshall Plan, but major segments of the industry are anticipating at least a 30 pct drop in foreign business this year, as against 1947.

Companies with foreign dealer setups have spurred their dealers to make up customer requirement lists, which have been sent to this country and placed before the proper people in Washington, but indications are that the machine tool industry will be lucky to get $75 million in foreign orders under the Marshall Plan the first year of participation. And if the Marshall Plan does not include machine tools, it is anybody's guess where foreign business is going to come from.

Indications are that Czechoslovakia is going to manufacture and sell machine tools, despite, or in accordance with, Russian occupation. Czechoslovakia's machine tools, according to trade sources, have in the past been fairly good competition in foreign markets, and the occupation is not apparently going to eradicate a competitive factor.

On the other hand, Russia is not buying machine tools in any volume from any country, including the United States, at the present time.

SCRAP

. . . News and Market Activities

Market Remains Firm and Active

New York

• • • **Despite the nose dive** in the mills' ingot rate, which is beginning in earnest this week, steelmaking scrap prices are firmer than they have been for some time.

This makes sense. The increasing loss of pig iron with a cutoff in coke creates a heavier scrap demand wherever the mills attempt to maintain operations. It will be remembered that in the last coal crisis many mills employed heavier scrap charges to maintain capacity, but after the strike was settled some officials expressed doubt as to the wisdom of this action.

Then, too, the mills want to get the scrap into their yards on the old theory that a ton in the hand is worth two in the bush. And along with the other reasons, the coal shortage will unquestionably make rail shipments more and more uncertain as time goes on and mill buyers remember only too well the exhaustion of scrap reserves which occurred over the winter months.

There is evidence so far in this crisis that mills will simply cut back in proportion to blast furnace operations. But that final decision to curtail furnaces is a really tough one to make and it is still a little early to know what the mills will finally decide to do.

The railroads apparently are not cutting off cars except where it is absolutely necessary and as a result no one has felt too much of a pinch so far. The 25 pct curtailment notification still stands, but action on that basis has not been instituted.

As expected, cast shipments dropped off with some price softness evidenced in areas where cupolas had to be taken off.

•

PITTSBURGH—The firm price undertone continued in the market during the past week with the coal strike preventing the oft seen signs of price softness in the spring. Openhearth steel scrap was still moving in fair volume with some of the larger producers laying down material. The only price change of the week was in short shoveling turnings, which advanced 50¢. This is a coal strike phenomenon because of the steel mills desire to increase blast furnace yield per ton of coke charged. Cast prices have not softened though foundry coal and coke stocks were at a critical point. Pig iron loss to date accentuates the nation-wide scrap shortage since in many districts mills have picked up scrap to maintain operations when blast furnaces were taken out of production.

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CHICAGO—Shipments continued heavy last week. There seems to be little doubt that the mills will permit shipments to come in regardless of the expiration date of old contracts. The market appears firm and everything from here on in depends on what happens in coal. The mills in general seem to have made up their minds that they will not attempt to keep steel production up should they be forced to curtail blast furnace operations. In other words they found during the last coal shutdown that eating up scrap inventories because of a hot metal shortage didn't pay and that it is a wiser plan to curtail all units in direct proportion to BF operations, hoard the scrap and be ready to resume full operations when the coal troubles are over.

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CLEVELAND—On the surface, there has been no change in the scrap market here or in the Valley. Major problem of the mills is still to get enough material at formula prices, which are showing everything but signs of weakness. Scrap is moving but not very well, although this is not the result of freight reductions caused by the coal strike. First lot of the canterbury tonnage rolled into the plant of a Canton consumer last week and according to reports, the material is pretty light for a heavy melting grade.

•

PHILADELPHIA—The scrap market in this district is stronger as mills are seeking scrap in anticipation of the need to step up the scrap content of the charge. Alan Wood has placed its small furnace in intermittent blast. All mills here would be willing to buy more scrap, but the volume coming out is not up to expectations. The cast scrap market is strong as steel mills are buying to supplement their pig iron supply. Pig iron is not quite as critical here as certain other mill supplies such as lime which is expected to be cut off by the end of the week. In the shortage of machinery and yard cast some foundries have been increasing their consumption of cast iron carwheels and the price has gone up.

•

DETROIT—Scrap flow in Detroit continues at an accelerated pace this week without any visible effects of the coal strike. All mill operations are at previous high levels and scrap prices remain unchanged. Some sources indicate that tighter inspection in other districts is tending to keep scrap here. Foundry shutdowns as a result of pig shortages may ease existing pressures on No. 1 cupola, according to some observers.

BIRMINGHAM—Sharp cutbacks in iron and steel production in this area from the coal mine strike have reduced demand for scrap generally. Orders are being placed on a day-to-day basis. In spite of the falling off in scrap movement, however, there has been no price softening.

•

BUFFALO—The market coasted last week while dealers and mills kept a close watch on the coal situation. Reduced operations by one of the leading consumers, however, brought no hint of a possible hold-up on shipments. Softness in turnings continued. No open market sales in those items were reported below the formula, although outside interests still were trying to place orders for machine shop and shoveling turnings at a price of approximately $34.25 Buffalo. Movement of all grades of scrap was slowed down by coal curtailments.

•

NEW YORK—Some foundry cutbacks are the only evidence so far of the coal shortage. Cupola cast dropped off as a result. Formula prices in openhearth material which have been well established for some weeks held again and very firmly.

•

BOSTON—Cast prices are still unsettled and down all of $1 a ton for the week, with consumers generally still playing for a further drop. Other varieties of scrap are moving fairly freely at former prices. Now that snow and ice are history, there is a freer movement of light scrap into yards. Supplies of borings and turnings are breaking even with demand.

•

CINCINNATI—Foundries are beginning to feel the effect of the coal strike and in some cases, are holding up scrap shipments. There is plenty of cast available, but at high prices, on which shipment holdups have had no effect. Openhearth grades are moving at formula prices and there is a strong undertone in the market. Coal shortages may bring about a temporary slowing, but the demand is there.

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ST. LOUIS—Scrap movement in this market has been heavier with shippers apparently fearing a price decline. Mills have not established prices for April, but it is believed that the present formula will prevail.

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TORONTO—Improved weather conditions have been reflected in minor betterment in scrap iron and steel collections, and while dealers report receipts slightly up, the shortage remains serious. Incoming scrap is meeting less than 25 pct of current needs, with most of the materials coming from industrial plants. Dealers look for further improvement in supply when shipments are resumed from Western Canada and from northern mining centers, as well as from rural districts. However, it is not expected that much scrap will be coming from these latter sources for another month or six weeks. No price changes have been announced.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
RR. hvy. melting	41.00 to 41.50
No. 2 hvy. melting	40.00 to 40.50
RR. scrap rails	55.00 to 56.00
Rails 2 ft and under	62.00 to 63.00
No. 1 comp'd bundles	40.00 to 40.50
Hand bdld. new shts	40.00 to 40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn	41.50 to 42.00
Mach. shop turn	35.50 to 36.00
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn	35.50 to 36.00
Cast iron boring	38.00 to 38.50
No. 1 cupola cast.	63.00 to 65.00
Hvy. breakable cast	52.00 to 53.00
Malleable	77.00 to 79.00
RR. knuck. and coup	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. leaf springs	54.00 to 55.00
Rolled steel wheels	54.00 to 55.00
Low phos.	47.00 to 47.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 dealers' bundles	38.50 to 39.50
Bundled mach. shop turn.	37.00 to 37.50
Galv. bundles	35.00 to 35.50
Mach. shop turn.	33.50 to 34.50
Short shov. turn.	35.00 to 36.50
Cast iron borings	34.50 to 35.50
Mix. borings & turn.	33.50 to 34.50
Low phos. hvy. forge	44.00 to 48.00
Low phos. plates	42.50 to 45.00
No. 1 RR. hvy. melt.	41.25 to 41.75
Rerolling rails	50.00 to 51.00
Miscellaneous rails	48.00 to 49.00
Angles & splice bars	49.00 to 51.00
Locomotive tires, cut	51.00 to 52.00
Cut bolster & side frames	47.00 to 48.00
Standard stl. car axles	56.00 to 57.00
No. 3 steel wheels	47.00 to 50.00
Couplers & knuckles	47.00 to 49.00
Rails, 2 ft and under	54.00 to 56.00
Malleable	73.00 to 75.00
No. 1 mach. cast	70.00 to 71.00
No. 1 agricul. cast	63.00 to 64.00
Heavy breakable cast.	50.00 to 52.00
RR. grate bars	58.00 to 59.00
Cast iron brake shoes	55.00 to 57.00
Cast iron carwheels	57.00 to 58.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos., plate	46.00 to 48.00
No. 1 cupola cast	63.00 to 64.00
Hvy. breakable cast	53.00 to 54.00
Rails 18 in. & under	59.00 to 60.00
Rails random length	51.00 to 52.00
Drop broken	66.00 to 68.00

BOSTON

Per gross ton, f.o.b. Boston

No. 1 hvy. melting	$31.65 to $31.90
No. 2 hvy. melting	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	.... 28.90
Machine shop trun.	.... 26.90
Mixed bor. & turn.	.... 26.90
Cl'n cast. chem. bor.	.... 36.00
No. 1 machinery cast	54.00 to 55.00
No. 2 machinery cast	54.00 to 55.00
Heavy breakable cast	50.00 to 51.00
Stove plate	52.00 to 55.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	.... $35.50
No. 2 hvy. melting	.... 35.50
No. 1 bundles	.... 35.50
New busheling	.... 35.50
Flashings	.... 35.50
Mach. shop turn.	$29.00 to 29.50
Shoveling turn.	30.00 to 30.50
Cast iron borings	30.00 to 30.50
Mixed bor. & turn.	28.50 to 29.00
Low phos. plate	39.50 to 40.50
No. 1 cupola cast.	61.00 to 63.00
Heavy breakable cast.	52.00 to 56.00
Stove plate	52.00 to 55.00
Automotive cast.	62.00 to 65.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	38.00 to 39.00
Mach. shop turn.	33.50 to 34.50
Shoveling turn.	33.50 to 34.50
Mixed bor. & turn.	33.50 to 34.50
Clean cast chemical bor.	40.00 to 42.00
No. 1 machinery cast	65.00 to 66.00
No. 1 mixed yard cast	63.00 to 65.00
Hvy. breakable cast.	59.00 to 60.00
Clean auto cast.	63.00 to 65.00
Hvy. axle forge turn.	41.00 to 42.00
Low phos. plate	45.00 to 46.00
Low phos. punchings	45.00 to 46.00
Low phos. bundles	43.50 to 44.50
RR. steel wheels	52.00 to 53.00
RR. coil springs	52.00 to 53.00
RR. malleable	72.00 to 75.00
Cast iron carwheels	65.00 to 68.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut	46.00 to 48.00
Mis. std. sec. rails	48.00 to 50.00
Rerolling rails	50.00 to 51.00
Steel angle bars	57.00 to 58.00
Rails 3 ft and under	53.00 to 55.00
RR. steel springs	48.00 to 50.00
Steel car axles	49.00 to 51.00
Grate bars	56.00 to 57.00
Brake shoes	54.00 to 55.00
Malleable	71.00 to 72.00
Cast iron car wheels	54.00 to 55.00
No. 1 machinery cast	64.00 to 65.00
Hvy. breakable cast	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
Long turnings	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	42.50 to 43.50
Structural and plate	42.50 to 43.50
No. 1 cupola cast.	60.00 to 65.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	47.50 to 50.00
Rails 3 ft & under	52.00 to 56.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	.... $34.50
No. 2 hvy. melting	.... 34.50
No. 2 bundles	.... 34.50
Comp. galv. bundles	$30.50 to 31.50
Mach. shop turn.	29.00 to 29.50
Mixed bor. & turn.	29.00 to 29.50
Shoveling turn.	31.00 to 32.00
No. 1 cupola cast.	57.00 to 58.00
Clean auto cast.	57.00 to 58.00
Hvy. breakable cast.	54.00 to 55.00
Charging box cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Unstrp. motor blks.	50.00 to 51.00
Cl'n chem. cast bor.	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.75 to $44.00
No. 2 hvy. melting	.... 39.75
No. 1 bundles	.... 39.75
No. 2 bundles	.... 39.75
No. 1 busheling	.... 39.75
Mach. shop turn.	.... 34.75
Shoveling turn.	.... 36.75
Cast iron borings	.... 35.75
Mixed bor. & turn.	.... 34.75
Mixed cupola cast.	62.00 to 65.00
Charging box cast.	54.00 to 55.00
Stove plate	58.00 to 60.00
Clean auto cast.	62.00 to 65.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	44.75 to 46.00
Scrap rails	58.00 to 59.00
Rails 3 ft & under	60.00 to 61.00
RR. steel wheels	51.00 to 52.00
Cast iron carwheels	51.00 to 52.00
RR. coil & leaf spgs	51.00 to 52.00
RR. knuckles & coup	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	35.50 to 36.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	65.00 to 70.00
Malleable	75.00 to 80.00
RR. cast.	70.00 to 73.00
Railroad grate bars	60.00 to 62.00
Stove plate	60.00 to 62.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft & under	60.00 to 61.00
Rails 18 in. & under	61.00 to 62.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	.... $25.00
No. 2 hvy. melting	.... 25.00
No. 2 bales	.... 25.00

Per gross ton delivered to consumer:

No. 3 bales	.... $19.50
Mach. shop turn.	.... 16.00
Elec. furn. 1 ft under	$32.00 to 34.00
No. 1 cupola cast.	34.00 to 37.00
RR. hvy. melting	.... 26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	.... $25.50
No. 2 hvy. melting	.... 25.50
No. 1 bales	.... 25.50
No. 2 bales	.... 25.50
No. 3 bales	.... 19.50
Mach. shop turn.	.... 17.50
No. 1 cupola cast.	$40.00 to 43.00
RR. hvy. melting	.... 26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	.... $26.00
Elec. furn. 1 ft and under	.... 30.00
No. 1 cupola cast.	40.00 to 42.00
RR. hvy. melting	.... 30.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	.... $22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact, prep'd	21.00*
Bushelings, new fact, unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$42.00 to 46.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

Steel Co

Sales of 24 Increased Strike-

Pittsburgh

• • • Earnings representing 88 ingot capacity w year than they 40 pct increase i ingot production strike-torn 1946. pay 1947 federal pct greater tha to include all c and operating re try would be abo

In the face of ings it would b common stock d been higher tha they rose only steel executives ing more money plus of the repo increased by 15 holding on to improvements and Many companies to cover replace today's higher c U. S. Steel set a this purpose;

Pittsburgh

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U. S. Steel

Bethlehem S

Republic Ste

Jones & Lat

Youngstown

National St

Inland Steel

American R

Sharon Stee

Wheeling St

DATA COVER OPERATIONS OF 24 COMPANIES REPRESENTING 88 PCT OF THE INGOT CAPACITY OF THE UNITED STATES AS OF JAN. 1, 1948.

Net Income Percent of Sales	et ome Ton ngot a- city	Net Income per Ton of Ingot Production	Year	COMPANY
6.0	07	$ 5.97	1947	U. S. Steel Corp.
5.9	00	4.16	1946	
4.9	38	3.99	1947	Bethlehem Steel Corp.
5.3	24	4.17	1946	
4.8	60	3.88	1947	Republic Steel Corp.
3.9	86	2.56	1946	
6.4	72	4.95	1947	Jones & Laughlin Steel Corp.
4.4	28	2.85	1946	
7.2	57	5.63	1947	Youngstown Sheet & Tube Co.
3.3	56	3.80	1946	
8.2	88	.....	1947	National Steel Corp.
8.5	25	.....	1946	
9.5	79	9.06	1947	Inland Steel Co.
7.1	58	5.54	1946	
8.0	59	8.12	1947	American Rolling Mill Co.
8.0	73	6.78	1946	
7.5	02	5.50	1947	Sharon Steel Corp.
5.2	91	3.27	1946	
4.6	99	3.16	1947	Colorado Fuel & Iron Corp.
5.8	*2¼*	*0.31*	1946	
7.9	41	8.12	1947	Wheeling Steel Corp.
4.9	00	4.25	1946	
1.9	65	.....	1947	Crucible Steel Co. of America
0.6	41	.....	1946	
4.7	75	3.99	1947	Pittsburgh Steel Co.
0.8	04	0.05	1946	
5.4	55	4.45	1947	Lukens Steel Co.
0.0	01	0.01	1946	
5.4	56	4.35	1947	Alan Wood Steel Co.
3.1	44	2.28	1946	
8.0	*30*	*1¼.12*	1947	The Midvale Co.
12.7	*50*	*2¼.15*	1946	
7.5	88	4.41	1947	Granite City Steel Co.
5.6	*19*	*3.09*	1946	
5.6	09	14.60	1947	Allegheny Ludlum Steel Corp.
6.9	34	18.14	1946	
4.8	56	4.10	1947	Continental Steel Corp.
3.9	60	3.22	1946	
5.4	38	4.96	1947	Laclede Steel Co.
3.9	07	2.39	1946	
14.8	45	16.19	1947	Keystone Steel & Wire Co.
14.3	17	11.85	1946	
5.5	31	.....	1947	Rotary Electric Steel Co.
4.7	83	.....	1946	
9.9	...10	10	1947	Follansbee Steel Corp.
7.0	...10	10	1946	
9.1	45	71.51	1947	Vanadium Alloys Steel Co.
7.0	72	43.43	1946	
6.1	66	$5.19	1947	GRAND TOTAL
5.5	06	4.19	1946	

8. Estimated steel.
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loss except in tax column where they its.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
RR. hvy. melting	41.00 to 41.50
No. 2 hvy. melting	40.00 to 40.50
RR. scrap rails	55.00 to 56.00
Rails 2 ft and under	62.00 to 63.00
No. 1 comp'd bundles	40.00 to 40.50
Hand bdld. new shts	40.00 to 40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn	41.50 to 42.00
Mach. shop turn	35.50 to 36.00
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn	35.50 to 36.00
Cast iron boring	38.00 to 38.50
No. 1 cupola cast.	63.00 to 65.00
Hvy. breakable cast	52.00 to 53.00
Malleable	77.00 to 79.00
RR. knuck. and coup	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. leaf springs	54.00 to 55.00
Rolled steel wheels	54.00 to 55.00
Low phos.	47.00 to 47.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 dealers' bundles	38.50 to 39.50
Bundled mach. shop turn.	37.00 to 37.50
Galv. bundles	35.00 to 35.50
Mach. shop turn.	33.50 to 34.50
Short shov. turn.	35.00 to 36.50
Cast iron borings	34.50 to 35.50
Mix. borings & turn	33.50 to 34.50
Low phos. hvy. forge	44.00 to 48.00
Low phos. plates	42.50 to 45.00
No. 1 RR. hvy. melt	41.25 to 41.75
Rerolling rails	50.00 to 51.00
Miscellaneous rails	48.00 to 49.00
Angles & splice bars	49.00 to 51.00
Locomotive tires, cut	51.00 to 52.00
Cut bolster & side frames	47.00 to 48.00
Standard stl. car axles	56.00 to 57.00
No. 3 steel wheels	47.00 to 50.00
Couplers & knuckles	47.00 to 49.00
Rails, 2 ft and under	54.00 to 56.00
Malleable	73.00 to 75.00
No. 1 mach. cast	70.00 to 71.00
No. 1 agricul. cast	63.00 to 64.00
Heavy breakable cast	50.00 to 52.00
RR. grate bars	58.00 to 59.00
Cast iron brake shoes	55.00 to 57.00
Cast iron carwheels	57.00 to 58.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn	32.50 to 33.00
Low phos., plate	46.00 to 48.00
No. 1 cupola cast	63.00 to 64.00
Hvy. breakable cast	53.00 to 54.00
Rails 18 in. & under	59.00 to 60.00
Rails random length	51.00 to 52.00
Drop broken	66.00 to 68.00

BOSTON

Per gross ton, f.o.b. Boston

No. 1 hvy. melting	$31.65 to $31.90
No. 2 hvy. melting	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	.... 28.90
Machine shop trun.	.... 26.90
Mixed bor. & turn	.... 26.90
Cl'n cast. chem. bor	.... 36.00
No. 1 machinery cast	54.00 to 55.00
No. 2 machinery cast	54.00 to 55.00
Heavy breakable cast	50.00 to 51.00
Stove plate	52.00 to 55.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	.... $35.50
No. 2 hvy. melting	.... 35.50
No. 1 bundles	.... 35.50
New busheling	.... 35.50
Flashings	.... 35.50
Mach. shop turn.	$29.00 to 29.50
Shoveling turn.	30.00 to 30.50
Cast iron borings	30.00 to 30.50
Mixed bor. & turn.	28.50 to 29.00
Low phos. plate	39.50 to 40.50
No. 1 cupola cast.	61.00 to 63.00
Heavy breakable cast.	52.00 to 56.00
Stove plate	52.00 to 55.00
Automotive cast.	62.00 to 65.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	38.00 to 39.00
Mach. shop turn.	33.50 to 34.50
Shoveling turn.	33.50 to 34.50
Mixed bor. & turn.	33.50 to 34.50
Clean cast chemical bor.	40.00 to 42.00
No. 1 machinery cast	65.00 to 66.00
No. 1 mixed yard cast	63.00 to 65.00
Hvy. breakable cast.	59.00 to 60.00
Clean auto cast.	63.00 to 65.00
Hvy. axle forge turn	41.00 to 42.00
Low phos. plate	45.00 to 46.00
Low phos. punchings	45.00 to 46.00
Low phos. bundles	43.50 to 44.50
RR. steel wheels	52.00 to 53.00
RR. coil springs	52.00 to 53.00
RR. malleable	72.00 to 75.00
Cast iron carwheels	65.00 to 68.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut	46.00 to 48.00
Mis. std. sec. rails	48.00 to 50.00
Rerolling rails	50.00 to 51.00
Steel angle bars	57.00 to 58.00
Rails 3 ft and under	53.00 to 55.00
RR. steel springs	48.00 to 50.00
Steel car axles	49.00 to 51.00
Grate bars	56.00 to 57.00
Brake shoes	54.00 to 55.00
Malleable	71.00 to 72.00
Cast iron car wheels	54.00 to 55.00
No. 1 machinery cast	64.00 to 65.00
Hvy. breakable cast	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
Long turnings	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	42.50 to 43.50
Structural and plate	42.50 to 43.50
No. 1 cupola cast.	60.00 to 65.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	47.50 to 50.00
Rails 3 ft & under	52.00 to 56.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	.... $34.50
No. 2 hvy. melting	.... 34.50
No. 2 bundles	.... 34.50
Comp. galv. bundles	$30.50 to 31.50
Mach. shop turn.	29.00 to 29.50
Mixed bor. & turn.	29.00 to 29.50
Shoveling turn.	31.00 to 32.00
No. 1 cupola cast.	57.00 to 58.00
Clean auto cast.	57.00 to 58.00
Hvy. breakable cast.	54.00 to 55.00
Charging box cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Unstrp. motor blks.	50.00 to 51.00
Cl'n chem. cast bor.	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.75 to $44.00
No. 2 hvy. melting	.... 39.75
No. 1 bundles	.... 39.75
No. 2 bundles	.... 39.75
No. 1 busheling	.... 39.75
Mach. shop turn.	.... 34.75
Shoveling turn.	.... 36.75
Cast iron borings	.... 39.75
Mixed bor. & turn.	.... 34.75
Mixed cupola cast.	62.00 to 65.00
Charging box cast.	54.00 to 55.00
Stove plate	58.00 to 60.00
Clean auto cast.	62.00 to 65.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 48.00
Low phos. plate	44.75 to 46.00
Scrap rails	58.00 to 59.00
Rails 3 ft & under	60.00 to 61.00
RR. steel wheels	51.00 to 52.00
Cast iron carwheels	51.00 to 52.00
RR. coil & leaf spgs	51.00 to 52.00
RR. knuckles & coup	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	35.50 to 36.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	65.00 to 70.00
Malleable	75.00 to 80.00
RR. cast.	70.00 to 73.00
Railroad grate bars	60.00 to 62.00
Stove plate	60.00 to 62.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft & under	60.00 to 61.00
Rails 18 in. & under	61.00 to 62.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	.... $25.00
No. 2 hvy. melting	.... 25.00
No. 2 bales	.... 25.00

Per gross ton delivered to consumer:

No. 3 bales	.... $19.50
Mach. shop turn.	.... 16.00
Elec. furn. 1 ft under	$32.00 to 34.00
No. 1 cupola cast.	34.00 to 37.00
RR. hvy. melting	.... 26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	.... $25.50
No. 2 hvy. melting	.... 25.50
No. 1 bales	.... 25.50
No. 2 bales	.... 25.50
No. 3 bales	.... 19.50
Mach. shop turn.	.... 17.50
No. 1 cupola cast.	$40.00 to 43.00
RR. hvy. melting	.... 26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt	.... $26.00
Elec. furn. 1 ft and under	.... 30.00
No. 1 cupola cast.	40.00 to 42.00
RR. hvy. melting	.... 30.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	.... $22.00*
No. 1 bundles	.... 22.00*
No. 2 bundles	.... 21.50*
Mechanical bundles	.... 20.00*
Mixed steel scrap	.... 19.00*
Mixed borings and turnings	.... 17.00*
Rails, remelting	.... 23.00*
Rails, rerolling	.... 26.00*
Bushelings	.... 17.00*
Bushelings, new fact, prep'd	.... 21.00*
Bushelings, new fact, unprep'd	.... 16.00*
Short steel turnings	.... 17.00*
No. 1 cast	$42.00 to 46.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

Steel Company 1947 Earnings Up 57 Pct

Sales of 24 Firms Tabulated Increased by 40 Pct Over Strike-Torn 1946

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

Pittsburgh

• • • **Earnings of** 24 steel companies representing 88 pct of the nation's ingot capacity were 57 pct higher last year than they were in 1946, on a 40 pct increase in sales volume. Their ingot production gained 26.5 pct. over strike-torn 1946. Money set aside to pay 1947 federal income taxes was 124 pct greater than in 1946. Projected to include all companies, total sales and operating revenues of the industry would be about $7.2 billion.

In the face of such a spurt in earnings it would be expected that 1947 common stock dividends would have been higher than they were. That they rose only 31 pct is ascribed by steel executives to the need for keeping more money in the business. Surplus of the reporting companies was increased by 15 pct as one step toward holding on to funds to finance improvements and replace equipment. Many companies also earmarked sums to cover replacement of equipment at today's higher costs. To name some: U. S. Steel set aside $26.3 million for this purpose; Youngstown Sheet & Tube, $4 million; and National Steel, $3.5 million.

Despite heavy expenditures for expansion and improvements, working capital of the reporting companies declined only 6 pct. Funded debt, however, was 11 pct higher and invested capital (the sum of preferred and common stock, funded long term debt and surplus) increased by 7 pct.

U. S. Steel Corp. has pointed out that its $127 million 1947 net income reduced to the terms of the purchasing power of the 1940 dollar, was $80 million. During this period steel base prices, not including extras, rose 39 pct and living costs were 67 pct higher. The corporation reported that hourly earnings were up 80 pct, weekly earnings 89 pct.

Among the reasons steel prices have been held down are technological improvements and a higher operating rate. Technological gains will continue under plans which most companies have for further modernization and new equipment. Steel executives also generally agree that barring interruptions, the prospects for continued high operations well on into 1948 are excellent.

The First Ten

Pittsburgh

• • • **Net income, in thousands of dollars, of the first 10 steel companies (rated in order of steel ingot capacity) with the percentage of increase in 1947 over 1946, is as follows:**

	1947	1946	Pct Increase 1947 over 1946
U. S. Steel Corp.	$127,098	$88,622	43.4
Bethlehem Steel Corp.	51,088	41,732	22.4
Republic Steel Corp.	31,018	16,033	93.5
Jones & Laughlin Steel Corp.	22,384	10,746	108.3
Youngstown Sheet & Tube Co.	22,300	14,255	56.4
National Steel Corp.	26,839	20,462	31.2
Inland Steel Co.	29,889	15,557	92.1
American Rolling Mill Co.	25,002	18,552	34.8
Sharon Steel Corp.	6,722	3,458	94.4
Wheeling Steel Corp.	10,445	5,373	94.4

COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	
U. S. Steel Corp.	1947	31,200,000	28,600,000	
	1946	29,500,000	21,300,000	
Bethlehem Steel Corp.	1947	12,900,000	12,806,941	
	1946	12,900,000	10,012,480	
Republic Steel Corp.	1947	8,600,000	7,987,170	
	1946	8,600,000	6,260,047	
Jones & Laughlin Steel Corp.	1947	4,741,500	4,520,387	
	1946	4,741,500	3,806,839	
Youngstown Sheet & Tube Co.	1947	4,002,000	3,959,343	
	1946	4,002,000	3,754,434	
National Steel Corp.	1947	3,900,000		
	1946	3,900,000		
Inland Steel Co.	1947	3,400,000	3,299,528	
	1946	3,400,000	2,811,003	
American Rolling Mill Co.	1947	3,292,000	3,078,487	
	1946	3,237,000	2,738,009	
Sharon Steel Corp.	1947	1,672,000	1,222,887	
	1946	1,500,000	874,190	
Colorado Fuel & Iron Corp.	1947	1,448,640	1,369,460	
	1946	1,392,420	1,072,242	
Wheeling Steel Corp.	1947	1,409,000	1,285,832	
	1946	1,344,000	1,264,414	
Crucible Steel Co. of America	1947	1,250,133		
	1946	1,273,350		
Pittsburgh Steel Co.	1947	1,072,557	1,006,888	
	1946	1,072,557	838,219	
Lukens Steel Co.	1947	624,000	637,347	
	1946	624,000	497,621	
Alan Wood Steel Co.	1947	550,000	449,945	
	1946	550,000	348,378	
The Midvale Co.	1947	517,322	84,020	
	1946	517,322	77,067	
Granite City Steel Co.	1947	500,000	440,398	
	1946	403,200	155,786	
Allegheny Ludlum Steel Corp.	1947	496,360	411,095	
	1946	460,360	363,797	
Continental Steel Corp.	1947	364,000	316,644	
	1946	364,000	293,527	
Laclede Steel Co.	1947	326,025	288,038	
	1946	326,025	275,002	
Keystone Steel & Wire Co.	1947	302,400	288,561	
	1946	302,400	285,148	
Rotary Electric Steel Co.	1947	170,000[3]		
	1946	170,000[3]		
Follansbee Steel Corp.	1947	141,120	130,262	
	1946	141,120	73,213	
Vanadium Alloys Steel Co.	1947	18,936	11,506	
	1946	18,936	12,519	
GRAND TOTAL	1947	82,897,993	74,584,000[4]	
	1946	80,740,190	58,937,000[4]	

1. Long term.
2. After 3-for-1 split.
3. Rolled steel products.
4. After appropriating $4 million for higher construction and replacement costs.

THE IRON AGE Financial Anal

Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes	Net Income	Net Income Percent of Sales	Number of Common Shares Outstanding	Earning Per Commo Share
31,200,000	28,600,000	96.7	20,200,000	$2,122,786,243	$91,000,000	$127,098,148	6.0	8,703,252	$11.71
29,500,000	21,300,000	72.9	15,200,000	1,496,064,326	32,000,000	88,622,475	5.9	8,703,252	7.29
12,900,000	12,806,941	99.3	9,403,067	1,032,337,825	31,000,000	51,088,375	4.9	8,954,982[2]	4.98
12,900,000	10,012,480	77.6	7,284,952	787,720,668	15,500,000	41,731,931	5.3	2,984,994	11.79
8,600,000	7,987,170	92.9	6,073,125	645,328,877	23,250,000	31,018,410	4.8	5,669,922	5.17
8,600,000	6,260,047	70.3	4,651,232	412,755,542	9,000,000	16,033,469	3.9	5,669,922	2.53
4,741,500	4,520,387	95.0	3,486,305[3]	350,132,366	13,384,000	22,383,591	6.4	2,476,502	8.45
4,741,500	3,806,839	80.0	2,866,578[3]	246,297,831	4,700,000	10,745,560	4.4	2,476,502	3.67
4,002,000	3,959,343	98.9	2,853,801	308,571,405	16,635,000	22,299,923[4]	7.2	1,675,008	13.31
4,002,000	3,754,434	81.0	2,392,325	216,276,426	9,275,000	14,254,905	3.3	1,675,008	8.51
3,900,000	.....	.....	.....	328,957,189	19,270,000	26,838,788	8.2	2,230,817	12.03
3,900,000	.....	.....	.....	239,764,320	13,875,000	20,461,651	8.5	2,206,492	9.17
3,400,000	3,299,528	97.0	2,941,990	315,041,042	18,485,000	29,888,558	9.5	4,899,315	6.10
3,400,000	2,811,003	82.7	2,295,808	217,739,493	8,998,150	15,556,897	7.1	4,899,315	3.18
3,292,000	3,078,487	93.5	2,413,406	311,685,322	16,464,876	25,002,211	8.0	3,241,276	7.44
3,237,000	2,738,009	84.6	2,096,487	231,930,811	11,449,833	18,552,491	8.0	3,241,315	5.35
1,672,000	1,222,887	76.6[5]	912,962	89,575,212	4,225,000	6,722,019	7.5	617,242	10.89
1,500,000	874,190	59.0	677,566	55,021,144	1,675,000	2,857,856[13]	5.2	617,242	4.39
1,448,640	1,369,460	94.5	1,046,008	94,740,442	3,515,100	4,329,991	4.6	1,126,775	3.40
1,392,420	1,072,242	77.0	831,155	58,118,237	400,000	*334,751*	*5.8*	1,126,975	*0.66*
1,409,000	1,285,832	91.3	.....	131,721,128	8,290,000	10,445,161	7.9	569,559	15.15
1,344,000	1,264,414	76.5	.....	110,397,692	2,082,000	5,372,910	4.9	569,559	6.25
1,250,133	.....	.....	.....	110,503,836	1,084,466	2,064,887	1.9	443,684	1.12
1,273,350	.....	.....	.....	88,417,091	*1,505,024*	527,417	0.6	444,230	Non
1,072,557	1,006,888	93.9	.....	85,142,237	3,175,000	4,019,637	4.7	508,917	6.20
1,072,557	838,219	78.1	.....	54,194,854	100,000	46,635	0.8	508,917	None
624,000	637,347	102.1	442,550	52,773,066	1,844,000	2,835,702	5.4	317,976	8.92
624,000	497,621	79.7	319,864	30,289,067	*290,898*	651	0.0	317,976	0.00
550,000	449,945	81.8	.....	35,971,661	1,238,000	1,955,446	5.4	200,000	7.26
550,000	348,378	63.3	.....	25,263,991	447,000	786,223	3.1	200,000	1.42
517,322	84,020	16.2	.....	14,829,373	None	*1,186,727*[8]	*8.0*	600,000	*1.98*
517,322	77,067	14.9	.....	14,665,297	None	*1,861,284*[8]	*12.7*	600,000	*3.10*
500,000	440,398	88.1	347,047	25,869,719	880,000	1,941,899	7.5	382,488	5.08
403,200	155,786	38.6	113,035	8,567,977	None	*481,696*	*5.6*	382,488	*1.26*
496,360	411,095	86.0[5]	357,000[14]	106,783,183	4,068,068	6,002,657	5.6	1,288,831	4.66
460,360	363,797	79.0	306,000[14]	95,277,573	5,031,152	6,599,346	6.9	1,288,286	5.12
364,000	316,644	87.0	.....	27,086,139	890,000	1,296,874	4.8	501,370	2.58
364,000	293,527	80.6	.....	24,330,784	900,000	946,119	3.9	501,383	1.89
326,025	288,038	88.3	272,852	26,283,120	968,042	1,429,035	5.4	206,250	6.93
326,025	275,002	84.3	241,164	17,140,184	474,500	675,303	3.9	206,250	3.27
302,400	288,561	95.4	273,151	31,573,658	2,458,436	4,672,934	14.8	625,000	7.48
302,400	285,148	94.3	261,160	23,610,560	2,704,895	3,379,018	14.3	757,632	4.46
170,000[9]	.....	.....	.....	16,500,149	544,000	903,360	5.5	167,025	5.41
170,000[9]	.....	.....	.....	10,114,334	300,000	480,438	4.7	166,225	2.89
141,120	130,262	92.3	208,112	28,715,064	1,800,000	2,841,568	9.9	345,688	8.22
141,120	73,213	51.9	118,901	17,419,825	716,000	1,220,635	7.0	267,064	4.57
18,936	11,506	60.8	.....	9,018,873	498,225	822,811	9.1	201,350	4.09
18,936	12,519	66.1	.....	7,744,808	365,200	543,756	7.0	202,682	2.68
82,897,993	74,584,000[11]	92.9[12]	.....	$6,301,927,129	$264,967,213	$386,715,258	6.1	45,953,229	.....
80,740,190	58,937,000[11]	72.5[12]	.....	4,489,122,835	118,197,808	246,717,955	5.5	40,013,709	.....

cts.
ıg $4 million for higher con-
acement costs.

5. Based on average 1947 capacity.
6. Fiscal year ends June 30.
7. Fiscal years ended Oct. 5, 1946 and Nov. 1, 1947.
8. Estimated tax carryback results i
credit to surplus for 1946 and $506
to surplus for 1947.
9. Estimated.

Analysis of the Steel Industry

	Earnings Per Common Share	Common Dividends Paid	Number of Preferred Shares Outstanding	Preferred Dividends Paid	Funded Debt[1]	Preferred Stock	Common Stock
	$11.71	$45,692,073	3,602,811	$25,219,677	$77,229,313	$360,281,100	$ 652,743,900
	7.29	34,813,008	3,602,811	25,219,677	81,197,155	360,281,100	652,743,900
	4.98	17,909,964	933,887	6,537,209	123,814,000	93,388,700	283,574,430
	11.79	17,909,964	933,887	6,537,209	125,814,000	93,388,700	283,574,430
	5.17	11,339,812	282,143	1,692,858	79,780,699	28,214,300	130,309,141
	2.53	5,669,907	282,143	1,692,858	61,440,000	28,214,300	130,309,141
	8.45	4,953,004	293,568	1,467,840	60,094,664	29,356,800	96,507,400
	3.67	4,736,195	293,568	1,649,244	28,154,412	29,356,800	96,507,400
	13.31	8,375,040	None	None	30,000,000	None	105,088,053
	8.51	5,025,024	None	None	30,000,000	None	105,088,053
	12.03	8,923,068	None	None	40,000,000	None	55,770,425
	9.17	7,231,486	None	None	40,000,000	None	55,766,050
	6.10	12,248,288	None	None	54,000,000	None	62,500,000
	3.18	8,981,914	None	None	57,000,000	None	62,500,000
	7.44	6,481,046	199,930	899,709	37,000,000	19,993,000	32,412,764
	5.35	4,050,666	199,930	1,181,059	38,500,000	19,993,000	32,413,153
	10.89	1,234,482	None	None	4,000,000	None	6,232,810
	4.39[13]	679,896	None	149,150	4,500,000	None	6,232,810
	3.40	957,789	502,818	502,830	9,750,000	10,056,357	5,633,875
	0.66	507,178	502,032	303,375	9,500,000	10,056,635	5,634,875
	15.15	996,728	363,166	1,815,830	42,850,000	36,316,600	28,477,950
	6.25	854,338	363,166	1,815,830	23,500,000	36,316,600	28,477,950
	1.12	None	313,579	1,567,980	24,505,000	31,357,900	11,092,097
	None	None	313,682	1,578,105	25,000,000	31,368,200	11,105,749
	6.20	None	164,382	481,467	8,650,000	16,438,200	4,862,190
	None	None	164,382	356,841	7,473,000	16,438,200	4,862,190
	8.92	445,166	None	None	None	None	3,179,760
	0.002	None	None	None	600,000	None	3,179,760
	7.26	None	71,824	1,221,008	None	7,182,433	4,388,889
	1.42	None	71,824	251,384	None	7,182,433	4,388,889
	1.98	1,198,785	None	None	None	None	10,574,621
	3.10	1,198,770	None	None	None	None	10,574,621
	5.08	382,488	None	None	None	None	8,483,821
	1.26	19,124	None	None	None	None	8,483,821
	4.66	2,577,008	None	None	None	None	8,055,194
	5.12	2,576,492	None	None	None	None	8,051,787
	2.58	752,059	None	None	None	None	7,018,970
	1.89	401,117	None	None	None	None	7,019,263
	6.93	360,938	None	None	2,437,500	None	4,125,000
	3.27	206,250	None	None	2,500,000	None	4,125,000
	7.48	1,898,750	None	None	2,500,000	None	2,604,167
	4.46	2,159,251	None	None	None	None	3,156,800
	5.41	41,756	None	None	731,654	None	1,670,250
	2.89	None	None	None	1,027,808	None	1,662,250
	8.22	786,254	None	None	None	None	3,419,511
	4.57	133,532	None	None	1,838,400	None	2,670,640
	4.09	453,183	None	None	None	None	2,000,000
	2.68	505,532	None	None	None	None	2,000,000
	.....	$128,007,681	6,728,108	$41,406,408	$597,342,830	$632,585,390	$1,530,725,218
	.....	97,659,644	6,728,225	40,734,732	538,044,775	632,595,968	1,530,528,532

ack results in $1,373,374 net
946 and $506,727 net charge

10. Not calculated because company buys all hot-rolled strip used in making much of its product.

12. National rate for entire industry by American Iron & Steel Institute.

11. Estimate as to inc publish

13. Before t

ficant tonnages of lead be- piled, but the current em- ing placed on a prepared- gram must contemplate a id diversion of strategic to the stockpile at the ex- civilian consumption. To stockpiling program has

ly Average Prices

The average prices of the onferrous metals in March n quotations appearing in N AGE, were as follows:

	Cents Per Pound
lytic copper, Valley	21.50
per, Conn. Val-	21.625
in, New York..	94.00
st St. Louis....	12.00
w York.....	12.61
. Louis.....	14.80
w York.....	15.00

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British buying price for in and its world selling be advanced on Apr. 7 to an announcement by h Ministry of Supply. price will be advanced gross ton to £504 per result of the pressure producers for a higher

•

inc market is in approx- ice. While most grades nsumers are able to ob- full requirements by round. Regular High ported to be in easiest effect of the coal strike ues will reduce galva- ations and result in de- nsumption of Prime is understood that zinc g into the strategic this time.

ancial Analysis of the Steel Industr

Ing, Capa Net T	Net Income Percent of Sales	Number of Common Shares Outstanding	Earnings Per Common Share	Common Dividends Paid	Number of Preferred Shares Outstanding	Preferred Dividends Paid	Funded Debt[1]	Preferred Stock	Common Stock
31,20[48]	6.0	8,703,252	$11.71	$45,692,073	3,602,811	$25,219,677	$77,229,313	$360,281,100	$ 652,743,90
29,50[75]	5.9	8,703,252	7.29	34,813,008	3,602,811	25,219,677	81,197,155	360,281,100	652,743,90
12,90[75]	4.9	8,954,982[2]	4.98	17,909,964	933,887	6,537,209	123,814,000	93,388,700	283,574,43
12,90[31]	5.3	2,984,994	11.79	17,909,964	933,887	6,537,209	125,814,000	93,388,700	283,574,43
8,60[10]	4.8	5,669,922	5.17	11,339,812	282,143	1,692,858	79,780,699	28,214,300	130,309,14
8,60[69]	3.9	5,669,922	2.53	5,669,907	282,143	1,692,858	61,440,000	28,214,300	130,309,14
4,74[91]	6.4	2,476,502	8.45	4,953,004	293,568	1,467,840	60,094,664	29,356,800	96,507,40
4,74[60]	4.4	2,476,502	3.67	4,736,195	293,568	1,649,244	28,154,412	29,356,800	96,507,40
4,00[234]	7.2	1,675,008	13.31	8,375,040	None	None	30,000,000	None	105,088,05
4,00[05]	3.3	1,675,008	8.51	5,025,024	None	None	30,000,000	None	105,088,05
3,96[88]	8.2	2,230,817	12.03	8,923,068	None	None	40,000,000	None	55,770,42
3,96[51]	8.5	2,206,492	9.17	7,231,486	None	None	40,000,000	None	55,766,05
3,46[58]	9.5	4,899,315	6.10	12,248,288	None	None	54,000,000	None	62,500,00
3,46[97]	7.1	4,899,315	3.18	8,981,914	None	None	57,000,000	None	62,500,00
3,2[11]	8.0	3,241,276	7.44	6,481,046	199,930	899,709	37,000,000	19,993,000	32,412,76
3,2[91]	8.0	3,241,315	5.35	4,050,666	199,930	1,181,059	38,500,000	19,993,000	32,413,15
1,6[19]	7.5	617,242	10.89	1,234,482	None	None	4,000,000	None	6,232,81
1,5[56][13]	5.2	617,242	4.39[13]	679,896	None	149,150	4,500,000	None	6,232,81
1,4[91]	4.6	1,126,775	3.40	957,789	502,818	502,830	9,750,000	10,056,357	5,633,87
1,3[51]	*5.8*	1,126,975	*0.66*	507,178	502,032	303,375	9,500,000	10,056,635	5,634,87
1,4[61]	7.9	569,559	15.15	996,728	363,166	1,815,830	42,850,000	36,316,600	28,477,95
1,3[10]	4.9	569,559	6.25	854,338	363,166	1,815,830	23,500,000	36,316,600	28,477,95
1,2[87]	1.9	443,684	1.12	None	313,579	1,567,980	24,505,000	31,357,900	11,092,09
1,2[17]	0.6	444,230	None	None	313,682	1,578,105	25,000,000	31,368,200	11,105,74
1,0[37]	4.7	508,917	6.20	None	164,382	481,467	8,650,000	16,438,200	4,862,19
1,0[35]	0.8	508,917	None	None	164,382	356,841	7,473,000	16,438,200	4,862,19
6[02]	5.4	317,976	8.92	445,166	None	None	None	None	3,179,76
6[51]	0.0	317,976	0.002	None	None	None	600,000	None	3,179,76
[46]	5.4	200,000	7.26	None	71,824	1,221,008	None	7,182,433	4,388,88
[23]	3.1	200,000	1.42	None	71,824	251,384	None	7,182,433	4,388,88
[278]	*8.0*	600,000	*1.98*	1,198,785	None	None	None	None	10,574,62
[84][8]	*12.7*	600,000	*3.10*	1,198,770	None	None	None	None	10,574,62
[99]	7.5	382,488	5.08	382,488	None	None	None	None	8,483,82
[96]	*5.6*	382,488	*1.26*	19,124	None	None	None	None	8,483,82
[57]	5.6	1,288,831	4.66	2,577,008	None	None	None	None	8,055,19
[46]	6.9	1,288,286	5.12	2,576,492	None	None	None	None	8,051,78
[74]	4.8	501,370	2.58	752,059	None	None	None	None	7,018,92
[19]	3.9	501,383	1.89	401,117	None	None	None	None	7,019,26
[35]	5.4	206,250	6.93	360,938	None	None	2,437,500	None	4,125,00
[03]	3.9	206,250	3.27	206,250	None	None	2,500,000	None	4,125,00
[34]	14.8	625,000	7.48	1,898,750	None	None	2,500,000	None	2,604,16
[18]	14.3	757,632	4.46	2,159,251	None	None	None	None	3,156,80
[60]	5.5	167,025	5.41	41,756	None	None	731,654	None	1,670,25
[38]	4.7	166,225	2.89	None	None	None	1,027,808	None	1,662,25
[68]	9.9	345,688	8.22	786,254	None	None	None	None	3,419,5
[35]	7.0	267,064	4.57	133,532	None	None	1,838,400	None	2,670,64
[11]	9.1	201,350	4.09	453,183	None	None	None	None	2,000,0
[56]	7.0	202,682	2.68	505,532	None	None	None	None	2,000,0
82[58]	6.1	45,953,229	.....	$128,007,681	6,728,108	$41,406,408	$597,342,830	$632,585,390	$1,530,725,2
80[55]	5.5	40,013,709	.....	97,659,644	6,728,225	40,734,732	538,044,775	632,595,968	1,530,528,5

8. Estimated tax carryback results in $1,373,374 net credit to surplus for 1946 and $506,727 net charge to surplus for 1947.

9. Estimated.

10. Not calculated because company buys all hot-rolled strip used in making much of its product.

11. Est as pu

12. National rate for entire industry by American Iron & Steel Institute.

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DATA COVER OPERATIONS OF 24 COMPANIES REPRESENTING 88 PCT OF THE INGOT CAPACITY OF THE UNITED STATES AS OF JAN. 1, 1948.

Common Stock	Surplus	Total Invested Capital	Working Capital	Capitalization per Ton of Ingot Capacity	Net Income per Ton of Ingot Capacity	Net Income per Ton of Ingot Production	Year	COMPANY
652,743,900	$ 497,735,179	$1,587,989,492	$ 548,648,098	$50.90	$ 4.07	$ 5.97	1947	U. S. Steel Corp.
652,743,900	441,548,781	1,535,770,936	629,078,938	52.06	3.00	4.16	1946	
283,574,430	188,459,762	689,236,892	290,114,970	53.43	4.38	3.99	1947	Bethlehem Steel Corp.
283,574,430	162,040,766	664,817,896	331,880,756	51.54	3.24	4.17	1946	
130,309,141	134,591,348	372,895,488	124,517,060	43.36	3.60	3.88	1947	Republic Steel Corp.
130,309,141	116,508,027	336,471,468	128,370,684	39.12	1.86	2.56	1946	
96,507,400	102,361,267	288,320,131	88,836,383	60.81	4.72	4.95	1947	Jones & Laughlin Steel Corp.
96,507,400	80,527,906	234,546,518	82,987,971	49.47	2.28	2.85	1946	
105,088,053	78,137,984	213,226,037	119,523,257	53.28	5.57	5.63	1947	Youngstown Sheet & Tube Co.
105,088,053	64,213,101	199,301,154	109,815,802	49.80	3.56	3.80	1946	
55,770,425	144,066,831	239,837,256	73,371,175	61.50	6.88	.....	1947	National Steel Corp.
55,766,050	126,148,236	221,914,286	76,419,281	56.72	5.25	.....	1946	
62,500,000	75,502,744	192,002,744	104,903,912	56.47	8.79	9.06	1947	Inland Steel Co.
62,500,000	65,162,473	184,662,473	98,862,118	54.31	4.58	5.54	1946	
32,412,764	107,094,839	196,500,603	76,821,865	59.69	7.59	8.12	1947	American Rolling Mill Co.
32,413,153	89,473,383	180,379,536	82,577,790	55.72	5.73	6.78	1946	
6,232,810	23,761,861	33,994,671	18,599,902	20.33	4.02	5.50	1947	Sharon Steel Corp.
6,232,810	18,274,324	29,007,134	15,404,068	19.34	1.91	3.27	1946	
5,633,875	34,874,261	60,314,493	17,217,825	41.63	2.99	3.16	1947	Colorado Fuel & Iron Corp.
5,634,875	32,009,281	57,200,791	18,290,210	41.08	*0.24*	*0.31*	1946	
28,477,950	35,774,867	143,419,417	53,572,106	101.79	7.41	8.12	1947	Wheeling Steel Corp.
28,477,950	28,142,265	116,436,815	48,227,215	86.63	4.00	4.25	1946	
11,092,097	22,807,983	89,762,980	32,472,422	71.80	1.65	.....	1947	Crucible Steel Co. of America
11,105,749	25,336,193	92,810,142	34,148,026	72.89	0.41	.....	1946	
4,862,190	21,860,000	51,810,390	20,750,000	48.31	3.75	3.99	1947	Pittsburgh Steel Co.
4,862,190	18,321,499	47,094,900	20,721,518	43.91	0.04	0.05	1946	
3,179,760	12,733,059	15,912,819	7,324,843	25.50	4.55	4.45	1947	Lukens Steel Co.
3,179,760	10,553,662	14,333,420	7,412,782	22.00	0.01	0.01	1946	
4,388,889	5,637,679	17,209,001	6,107,704	31.29	3.56	4.35	1947	Alan Wood Steel Co.
4,388,889	4,903,241	16,474,563	7,151,023	29.95	1.44	2.28	1946	
10,574,621	9,874,500	20,449,131	15,219,255	39.53	*2.30*	*1¼.12*	1947	The Midvale Co.
10,574,621	9,264,660	19,839,281	17,231,273	38.35	*3.60*	*2¼.15*	1946	
8,483,821	5,822,683	14,306,504	5,314,940	28.61	3.88	4.41	1947	Granite City Steel Co.
8,483,821	4,263,271	12,747,092	4,637,865	31.61	*1.19*	*3.09*	1946	
8,055,194	31,683,177	39,738,371	20,846,259	80.06	12.09	14.60	1947	Allegheny Ludlum Steel Corp.
8,051,787	28,242,396	36,294,183	22,052,784	78.84	14.34	18.14	1946	
7,018,970	6,240,353	12,259,323	6,309,514	33.68	3.56	4.10	1947	Continental Steel Corp.
7,019,263	5,327,460	12,346,723	7,782,801	33.92	2.60	3.22	1946	
4,125,000	3,147,843	9,710,343	4,769,059	29.78	4.38	4.96	1947	Laclede Steel Co.
4,125,000	2,234,433	8,859,433	5,011,203	27.17	2.07	2.39	1946	
2,604,167	8,476,499	13,580,666	3,848,340	44.91	15.45	16.19	1947	Keystone Steel & Wire Co.
3,156,800	10,454,962	13,611,762	5,877,559	45.01	11.17	11.85	1946	
1,670,250	1,867,287	4,269,191	2,634,289	25.11	5.31	.....	1947	Rotary Electric Steel Co.
1,662,250	1,201,684	3,891,742	2,205,792	22.89	2.83	.....	1946	
3,419,511	8,430,408	11,849,919	6,251,792	83.97	.....[10]	.....[10]	1947	Follansbee Steel Corp.
2,670,640	5,391,593	9,900,633	4,592,570	70.16	.....[10]	.....[10]	1946	
2,000,000	5,027,072	7,027,072	5,056,701	371.10	43.45	71.51	1947	Vanadium Alloys Steel Co.
2,000,000	4,664,372	6,664,372	4,725,275	351.94	28.72	43.43	1946	
$1,530,725,218	$1,565,969,486	$4,325,622,934	$1,653,031,671	$52.18	$4.66	$5.19	1947	GRAND TOTAL
1,530,528,532	1,357,207,969	4,055,377,253	1,765,465,304	50.23	3.06	4.19	1946	

11. Estimated, based on national operating rate so as to include companies listed above that do not publish production figures.
13. Before transfer of $600,000 from contingency reserve.
14. Finished Steel.

Italics indicate loss except in tax column where they represent credits.

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NONFERROUS METALS

. . . News and Market Activities

Meet on Copper Stockpile

New York

• • • **Members of** the copper industry advisory committee will meet with munitions board officials at Washington this Thursday to discuss the prospects for expediting the stockpiling of copper. If an acceleration of the copper stockpiling program is to be worked out, it is the opinion fo the industry that a rigid program of allocations must accompany it. Present demands for copper from all sources far exceed available supplies. Foreign demand for copper continues heavy but weighted average prices indicate that the largest volume of sales continues to be made at the 21.50¢ equivalent price being adhered to by domestic producers. It is the impression of some members of the industry that the imposition of a stockpiling program on the heavy current demand for the metal would result in added pressure on the price structure and allocations would have to be accompanied by some form of price control. According to industry reports, meetings have not yet been scheduled for stockpiling action on any other nonferrous metal. However, it is the impression of the trade that meetings of other groups may be expected to follow.

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Lead

• • • **Strikes at the** Mexican smelting and refining plants have been concluded and only four mining properties were still on strike last week. But the loss of metal production when superimposed on the former worldwide shortage of lead has placed consumers in a precarious position. Consumers in the East have been paying as much as 16½¢ c.i.f. New York, plus duty, for lead imports whose origin is believed in the trade to be principally Australia, Spain and Italy. Midwest consumers are buying secondary lead at prices ranging from 17¢ to 18¢ per lb. The payment of these higher prices by consumers is exercising strong pressure on the domestic market price which has held so far at previous levels. Major producers are anxious to maintain the present price level as they admit that higher prices will not be likely to bring new tonnages into production. It is more than likely, however, that a domestic lead price increase looms in the immediate future. It will be necessary to continue the importation of foreign concentrates which would decline in volume at prices lower than the world market. Also domestic mines shipping their concentrates to custom smelters would be unwilling to ship at domestic prices lower than the world level. The shutdown of Mexican plants and mines created a major lead shortage abroad as not more than half of the Mexican lead production of 18,000 tons per month came into this country.

Lead output from domestic mines totaled 32,896 short tons in January, according to the Bureau of Mines, the largest monthly production since April of last year, and 5 pct above the average monthly production rate of 1947. Sixty percent of the total came from 12 western states whose production of recoverable lead was the highest of any month since April 1944. This record is an indication of the effectiveness of current high domestic prices in bringing up mine production levels.

In the background of the present shortage of lead, there is the need of the government to place tonnages of lead and other nonferrous metals in the strategic stockpile. So far, there is no knowledge of any significant tonnages of lead being stockpiled, but the current emphasis being placed on a preparedness program must contemplate a more rapid diversion of strategic metals into the stockpile at the expense of civilian consumption. To date the stockpiling program has been restricted to metals in a surplus position.

As yet there is no evidence that the higher prices paid for lead by some consumers have raised the eastern dealer lead scrap market.

Monthly Average Prices

• • • **The average prices of the major nonferrous metals in March based on quotations appearing in** THE IRON AGE, **were as follows:**

	Cents Per Pound
Electrolytic copper, Conn. Valley	21.50
Lake copper, Conn. Valley	21.625
Straits tin, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.61
Lead, St. Louis	14.80
Lead, New York	15.00

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Tin

• • • **The British buying** price for Malayan tin and its world selling price will be advanced on Apr. 7 according to an announcement by the British Ministry of Supply. The buying price will be advanced by £4 per gross ton to £504 per ton as the result of the pressure by Malayan producers for a higher price.

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Zinc

• • • **The zinc market** is in approximate balance. While most grades are tight, consumers are able to obtain their full requirements by shopping around. Regular High Grade is reported to be in easiest supply. The effect of the coal strike as it continues will reduce galvanizing operations and result in decreased consumption of Prime Western. It is understood that zinc is not going into the strategic stockpile at this time.

Nonferrous Metals Prices

Cents per pound

	Mar. 31	Apr. 1	Apr. 2	Apr. 3	Apr. 5	Apr. 6
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, 10,000 lb, f.o.b shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	33.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$95 to $105
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$76.50 to $77
Nickel, electro, f.o.b. New York	36.56
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$86 to $89
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.61
Zirconium copper, 6 pct Zr, per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.00–19.25
No. 120	18.50–18.75
No. 123	18.00–18.25
80-10-10 ingot	
No. 305	24.25
No. 315	21.75
88-10-2 ingot	
No. 210	30.00
No. 215	28.00
No. 245	21.75–22.75
Yellow ingot	
No. 405	15.00–16.00
Manganese bronze	
No. 421	18.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	17.50-17.75
0.60 copper, max.	17.25-17.50
Piston alloys (No. 122 type)	16.50-16.75
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.25-16.75
195 alloy	16.50-16.75
AXS-679	**16.50-17.00**
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-95½ pct	16.50-17.00
Grade 2—92 pct-95 pct	16.00-16.50
Grade 3—90 pct-92 pct	15.75-16.00
Grade 4—85 pct-90 pct	15.25-15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32⅝
Rolled, oval, straight, delivered	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulfate, 99.5, crystals, bbls.	11.50
Nickel salts, single, 425 lb bbls. frt. allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 24¢; 4S, 61S-O, 25.8¢; 52S, 27.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢. 0.081 in.; 2S, 3S, 25¢; 4S, 61S-O, 27.1¢; 52S, 29¢; 24S-O, 24S-OAL, 27.7¢; 75S-O, 75S-OAL, 34.3¢. 0.032 in.; 2S, 3S, 26.4¢; 4S, 61S-O, 30.1¢; 52S, 32.6¢; 24S-O, 24S-OAL, 34.2¢; 75S-O, 75S-OAL, 43.1¢.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 4S-F, 23.2¢; 52S, 24.2¢; 61S-O, 23.8¢; 24S-F,24S-FAL, 24.2¢; 75S, 75S-AL, 30.5¢.

Extruded Solid Shapes: Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69¢; 23 to 25, 33.4¢ to 90¢; 35 to 37, 40.8¢ to $1.25; 47 to 49, 58.7¢ to $1.84.

Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ⅜ to ½ in., 29¢ to 43¢; ¼ to ⅜ in., 30¢ to 46.5¢; 7/32 to 7/32 in., 32.5¢ to 53.5¢; 9/64 to 7/32 in., 35.5¢ to 62¢.

Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 30¢ to 26.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 32¢ to 28¢.

Screw Machine Stock: Drawn, 1½ to ⅛ in., 11S-T3, 34¢ to 45¢; cold-finished, ⅝ to 1½ in., 11S-T3, 33¢ to 31¢; rolled, 1⅞ to 3 in., 11S-T3, 31¢ to 28.5¢.

Drawn Wire: coiled, 0.051 to 0.374 in.: 2S, 33¢ to 24¢ 52S, 40.5c to 29c; 56S, 42.5¢ to 34.5¢; 17S-T4, 46¢ to 31¢; 61S-T4, 41c to 30.5c; 75S-T6, 66¢ to 46¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58c-60c; 10, 59c-61c; 12, 63-65c; 14, 69c-74c; 16, 76c-81c; 18, 84c-89c 20, 96c-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Round Rod: M, diam., in., ⅛ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 7/16, $1.21; 7/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.36*	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leaded brass	28.64	24.69	....
Commercial bronze	35.68*	32.96	33.27
Manganese bronze	33.87	32.37	38.47
Phosphor bronze, 5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoy, Olympic, etc.	37.24	37.50	38.56
Nickel silver, 10 pct.	41.80	42.68	40.54
5 pct	....	....	38.98
Architectural bronze	28.61	....	....

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	19⅛	18⅝
Yellow brass	15⅝	14⅝
Red brass	17½	16⅝
Commercial bronze	17⅝	16⅞
Manganese bronze	15¼	14⅜
Leaded brass rod ends	15¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1, copper, wire	18.50
No. 2 copper, wire	17.50
Light copper	16.50
Refinery brass	16.25–16.50*

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	17.50–17.75
No. 2 copper, wire	16.50–16.75
Light copper	15.50–15.75
No. 1 composition	14.50
No. 1 comp. turnings	14.00
Rolled brass	11.00–11.25
Brass pipe	11.50–11.75
Radiators	11.25–11.50
Heavy yellow brass	10.50
Aluminum	
Mixed old cast	9.75
Mixed old clips	9.50
Mixed turnings	8.75
Pots & pans	10.00
Low copper	10.50–10.75

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass	
No. 1 heavy copper and wire	16¼—16⅝
No. 2 heavy copper and wire	15¼—15½
Light copper	14 —14½
Auto radiators (unsweated)	9½—10
No. 1 composition	12½—13
No. 1 composition turnings	12 —12½
Clean red car boxes	9½—10
Cocks and faucets	9½—10
Mixed heavy yellow brass	7¾— 8¼
Old rolled brass	8¼— 8¾
Brass pipe	9½— 9¾
New soft brass clippings	12 —12½
Brass rod ends	9¾—10¼
No. 1 brass rod turnings	9¼— 9¾
Aluminum	
Alum. pistons with struts	4½— 5
Aluminum crankcases	7 — 7½
2S aluminum clippings	9 — 9½
Old sheet & utensils	7 — 7½
Dry borings and turnings	2½— 3
Misc. cast aluminum	6½— 7
Dural clips (24S)	6 — 6½
Zinc	
New zinc clippings	7½— 8
Old zinc	5 — 5½
Zinc routings	3 — 3½
Old die cast scrap	3½— 4
Nickel and Monel	
Pure nickel clippings	16 —17
Clean nickel turnings	12½—13
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	6½— 7
Lead	
Soft scrap lead	13 —13½
Battery plates (dry)	7¼— 7½
Magnesium Alloys	
Segregated solids	7½— 8
Castings	4½— 5½
Miscellaneous	
Block tin	75 —77
No. 1 pewter	60 —62
No. 1 auto babbitt	45 —47
Mixed common babbitt	13¾—14¼
Solder joints	16¾—17¼
Siphon tops	45 —47
Small foundry type	16½—16¾
Monotype	15½—15¾
Lino. and stereotype	14¼—14¾
Electrotype	11¾—12¼
New type shell cuttings	14½—15
Hand picked type shells	6½— 7
Lino and stereo dross	6½— 7
Electro dross	5½— 6

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Apr. 6, 1948	Mar. 30, 1948	Mar. 9, 1948	Apr. 8, 1947
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.65
Plates wrought iron	7.25	7.25	7.25	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	8.65	6.15
Wire: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.30
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$2.50
Light rails	3.10	3.10	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00†	$45.00†	$45.00†	$42.00
Slabs, rerolling	45.00†	45.00†	45.00†	42.00
Forging billets	54.00†	54.00†	54.00†	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.90	2.90	2.90	2.35

†Net ton

Pig Iron: (per gross ton)	Apr. 6, 1948	Mar. 30, 1948	Mar. 9, 1948	Apr. 8, 1947
No. 2, foundry, Phila.	$44.61	$44.61	$44.61	$36.51
No. 2, Valley furnace	39.50	39.50	39.50	33.50
No. 2, Southern Cin'ti	43.28	43.28	43.28	34.75
No. 2, Birmingham	37.38	37.38	37.38	29.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	33.00
Basic del'd Philadelphia	44.11	44.11	44.11	36.92
Basic, Valley furnace	39.00	39.00	39.00	33.00
Malleable, Chicago†	39.50	39.50	39.50	33.50
Malleable, Valley	39.50	39.50	39.50	33.50
Charcoal, Chicago	62.46	62.46	62.46	45.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.25	$40.25	$40.25	$38.50
Heavy mlt'g steel, Phila.	41.50	41.50	40.00	34.50
Heavy melt'g steel, Ch'go	39.00	39.00	39.00	33.25
No. 1, hy. comp. sh't, Det.	35.50	35.50	35.50	32.25
Low phos. Young'n.	45.25	45.25	45.25	40.50
No. 1, cast, Pittsburgh	64.00	64.00	61.00	46.00
No. 1, cast, Philadelphia	65.00	65.50	65.50	49.00
No. 1, cast, Chicago	70.50	69.00	69.00	43.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	$9.00
Foundry coke, prompt	14.00	14.00	14.00	10.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	21.50
Copper, Lake Conn.	21.625	21.625	21.625	21.625
Tin, Grade A, New York	94.00	94.00	94.00	80.00
Zinc, East St. Louis	12.00	12.00	12.00	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Apr. 6, 1948	3.23940¢ per lb.	*$40.11* per gross ton	$40.25 per gross ton
One week ago	3.23940¢ per lb.	$40.29 per gross ton	$40.25 per gross ton
One month ago	3.23940¢ per lb.	$40.37 per gross ton	$39.75 per gross ton
One year ago	2.86354¢ per lb.	$33.15 per gross ton	$35.42 per gross ton

	HIGH	LOW
1948	3.23940¢ Feb. 17	3.19411¢ Jan. 6
1947	3.19411¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1948	$40.37 Feb. 17	$39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov. 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1930	18.21 Jan. 7	15.90 Dec. 16
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1948	$41.83 Jan. 29	$39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1930	15.00 Feb. 18	11.25 Dec. 9
1929	17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 31½ in. wide. (16) Delivered Los Angeles; add ½¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) $2 more. (19) $1 per ton more.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS Carbon, rerolling	($36.00 per net ton f. o. b. mill) (Spot market as high as $75 to $90 gross ton)														
Carbon, forging	$46.00	(per net ton)													
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS Carbon, rerolling[17]	$45.00[18]	$45.00[18]	$45.00[18]	$47.00	$45.00[18]	$45.00[18]	(per net ton)								
Carbon, forging billets	$54.00	$54.00	$54.00	$54.00	$54.00	$54.00	(per net ton)								
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)								
SHEET BARS	Subject to negotiation														
PIPE SKELP	2.90¢						2.90¢								
WIRE RODS	2.80¢[19]	2.80¢		2.80¢	2.85¢		(Worcester = 2.90¢)					3.52¢[13]			
SHEETS Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢		(Ashland, Ky. = 2.80¢)		3.54¢[16]	2.96¢	3.148¢	3.040¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.71¢	4.00¢	4.016¢
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢[16]		4.298¢	4.190¢
Enameling (12 gage)	3.95¢	3.95¢	3.95¢	3.95¢			3.95¢		4.05¢	3.95¢			4.11¢	4.466¢	4.406¢
Long ternes[2] (10 gage)	4.05¢		4.05¢											4.566¢	4.506¢
STRIP Hot-rolled[3]	2.80¢	2.80¢	2.80¢	2.80¢[13]	2.80¢		2.80¢					3.60¢[16]	2.96¢	3.316¢	3.256¢
Cold-rolled[4]	3.55¢	3.65	3.65¢	3.55¢			3.55¢			(Worcester = 3.75¢)			3.71¢	4.066¢	4.006¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.616¢	
TINPLATE Cokes, 1.50 lb[5], base box	$6.80	$6.80	$6.80		$6.90			$6.90	$6.90	(Warren, Ohio = $6.80)				$7.248	$7.140
Electro, box {0.25 lb / 0.50 lb / 0.75 lb}	Deduct $1.00 from 1.50 lb coke base box price. Deduct 80¢ from 1.50 lb coke base box price. Deduct 60¢ from 1.50 lb coke base box price.														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING 55 lb to 70 lb / 75 lb to 95 lb / 100 lb to 128 lb	Deduct $1.60 from 1.50 lb coke base box. Deduct $1.70 from 1.50 lb coke base box. Deduct $1.60 from 1.50 lb coke base box.														
BLACKPLATE, h. e. 29 ga[11]	4.75¢	4.75¢	4.75¢		4.85¢			4.85¢	4.85¢					5.198¢	5.090¢
BARS Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[16]	3.06¢	3.35¢	3.356¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[16]		3.098¢	2.990¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.71¢	4.00¢	4.006¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)							3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢			(Canton = 4.10¢)						
PLATE Carbon Steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	(Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 3.10¢) 2.95¢				3.838¢[14]		3.298¢	3.190¢
Floor plates	4.20¢	4.20¢		4.20¢										4.716¢	4.656¢
Alloy	3.80¢	3.80¢	3.80¢		(Coatesville = 4.80¢)									4.316¢	4.256¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.95¢, Bethlehem = 2.80¢)					3.43¢[10]		3.040¢	2.932¢
SPRING STEEL, C-R 0.08 to 0.40 carbon	3.55¢			3.55¢			(Worcester = 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester = 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester = 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester = 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester = 9.65¢)								
MANUFACTURERS' WIRE[9] Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		4.022¢	4.006¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.737¢[13]		5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.756¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.48	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	28.76
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium* 47¢
Oil hardening manganese* 26¢
Special carbon* 24¢
Extra carbon* 20¢
Regular carbon* 17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Armature	4.80¢ to 5.05¢
Electrical	5.30¢ to 5.55¢
Motor	6.05¢ to 6.30¢
Dynamo	6.75¢ to 7.50¢
Transformer 72	7.25¢ to 8.25¢
Transformer 65	7.95¢ to 9.20¢
Transformer 58	8.65¢ to 9.90¢
Transformer 52	9.45¢ to 9.70¢

F.o.b. Chicago and Gary: armature through motor only. F.o.b. Granite City add to lower quotation 0.45¢ for armature through & 72, and 0.35¢ for balance.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., per 100 lb $2.75
Angle splice bars, 100 lb 3.85
(F.o.b. basing points) *per 100 lb*
Light rails (from billets) $3.10

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.65¢
Tie plates, Pittsburg, Calif.	3.80¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo.; Birmingham; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	31.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base	Column San Francisco
Standard & coated nails*	94	115
Galvanized nails*	94	115
Woven wire fence†	100	123
Fence posts, carloads††	105	...
Single loop bale ties	99	123
Galvanized barbed wire**	113	123
Twisted barbless wire	113	...

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Pittsburgh, Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire ‡	$4.20	$5.21
Annealed, galv. fencing ‡	4.65	5.66
Cut nails, carloads ‡‡	6.30	...

‡ Add 10¢ at Worcester. ‡‡ Pittsburgh only, less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	.30	5.30	5.30	5.30	5.30
Galvanized		6.00	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	...	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	..	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	47	29½
¾-in.	50	33½
1-in.	52½	36½
1¼-in.	53	37
1½-in.	53½	37½
2-in.	54	38
2½ and 3-in.	54½	38½
Wrought Iron, buttweld		
½-in.	+11	+35
¾-in.	+ 1½	+25
1 and 1¼-in.	4	+16½
1½-in.	9½	+13
2-in.	10	+12½
Steel, lapweld		
2-in.	44½	28
2½ and 3-in.	48½	32
3½ to 6-in.	50½	34
Steel, seamless		
2-in.	43½	27
2½ and 3-in.	46½	30
3½ to 6-in.	48½	32
Wrought Iron, lapweld		
2-in.	1½	+20
2½ to 3½-in.	4	+16
4-in.	8	+10½
4½ to 8-in.	6	+12

Extra Strong, plain ends

Steel, buttweld		
½-in.	46	30
¾-in.	50	34
1-in.	52	37
1¼-in.	52½	37½
1½-in.	53	38
2-in.	53½	38½
2½ and 3-in.	54	39
Wrought Iron, buttweld		
½-in.	+ 6½	+29
¾-in.	+ ½	+23
1 and 1¼ in.	4	+16½
2-in.	10	+12½
Steel, lapweld		
2-in.	43½	28
2½ and 3-in.	48½	33
3½ to 6-in.	52	36½
Steel, seamless		
2-in.	42½	27
2½ and 3-in.	46½	31
3½ and 6-in.	50	34½
Wrought Iron, lapweld		
2-in.	4½	+16½
2½ to 4-in.	13	+ 6
4½ to 6-in.	9	+10½

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in In.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$17.84	$20.99	$17.30	$20.36
2½	12	23.99	28.21	23.27	27.36
3	12	26.68	31.40	25.88	30.46
3½	11	33.35	39.26	32.35	38.08
4	10	41.40	48.70	40.16	47.24

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago $91.12
6-in. to 24-in. del'd New York 89.18
6-in. to 24-in., Birmingham 79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less 105.90
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

½ in. & smaller x 6 in. & shorter... 45
9/16 & ⅝ in. x 6 in. & shorter..... 46
¾ in. & larger x 6 in. & shorter..... 43
All diam, longer than 6 in. 41
Lag, all diam over 6 in. long..... 44
Lag, all diam x 6 in. & shorter..... 46
Plow bolts 54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 43
9/16 to 1 in. inclusive 42
1⅛ to 1½ in. inclusive 40
1⅝ in. and larger 35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	..	46
½ in. and smaller	44	..
½ in. through 1 in.	..	44
9/16 in. through 1 in. ...	43	..
1⅛ in. through 1½ in. ...	41	42
1⅝ in. and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .....65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets *(½ in. and larger)*
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets *(7/16 in. and smaller)*
Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws
(In packages) *Percent Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright 53
¾ to 1 in. x 6 in., SAE 1035, heat treated 44
Set screws, oval points 56
Milled studs 29
Flat head cap screws, listed sizes... 16
Fillister head cap, listed sizes .. 37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	Base price per short ton
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%.....	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer..... $6.60
Old range, nonbessemer..... 6.45
Mesabi, bessemer 6.35
Mesabi, nonbessemer 6.20
High phosphorus 6.20
Prices effective for 1948 season.

METAL POWDER

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh .....24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh .....30⅝¢ to 34⅝¢
Copper, reduced, 150 and 200 mesh .....30½¢ to 32¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots..11.5¢ to 14.5¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags..7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh ..... 10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 5¢
Iron, hydrogen reduced, minus 80 mesh, 98 + % Fe..... 11.00¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots .....63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.. 44¢
Iron, electrolytic, annealed, 100, minus 200 mesh, 99.5 + % Fe .....19.5¢ to 23.5¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 39½¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots .....23¢ to 29¢
Antimony, 100 mesh ..... 44¢
Cadmium, 100 mesh $2.00
Chromium, 100 mesh and finer... $1.025
Lead, 100, 200 & 300 mesh 20½¢ to 25½¢
Manganese, minus 325 mesh and coarser ..... 59¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 29¢
Solder powder, 100 mesh..8½¢ plus metal
Stainless steel, 302, minus 100 mesh 75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.. $2.65
Under 100 lb $2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	$12.00 to $13.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$18.60
Chicago, f.o.b.	17.50
New England, del'd	20.40
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	20.15
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
No. 1 Ohio	$67.00
First quality, Pa., Md., Ky., Mo., Ohio	73.00
First quality, New Jersey	78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	67.00
Sec. quality, New Jersey	70.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50
Silica Brick	
Pennsylvania and Birmingham	$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern)	12.50
East Chicago	13.50
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$64.00
Magnesite Brick	
Standard, Balt. and Chester	$86.00
Chemically bonded, Baltimore	75.00
Grain Magnesite	
std. ⅝-in. grains	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
in sacks with fines	31.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$11.05

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.56	$5.77	$5.90	$4.82	....	$4.85	$4.57	$4.87	$5.75	$8.47	$8.77	$10.30	$10.45
New York	4.76	5.76[1]	6.16	5.08	$6.08	5.11	4.80	5.06	5.80	8.68	8.83	10.35	10.50
Boston	4.83	5.69	6.23[12]	5.61	6.87	5.18	4.91	5.04	5.88	8.99	9.14	10.43	10.58
Baltimore	4.32	....	5.72	4.80	....	4.77	4.71	4.85	5.71	....	....	....	....
Norfolk	4.90	....	....	5.30	....	5.15	5.15	5.20	6.00	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45-6.65	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
Milwaukee	4.458	5.308	5.858	5.058	5.658	4.808	4.608	4.608	5.395	8.645	8.795	9.945	10.095
Cleveland	4.25	5.10[1]	5.82	5.05	....	4.60†	4.70	4.40	5.10	8.61	8.76	9.50	9.65
Buffalo	4.25	5.10	6.03	5.23	5.72[5]	4.98	4.40	4.40‡	5.10	8.20	8.35	9.50	9.65
Detroit	4.41	5.26	6.07	4.77	5.67	4.92†	4.82	4.56-4.82	5.26	8.82	8.97	10.09	10.24
Cincinnati	4.56	5.22	5.77	4.77	....	4.98	4.82	4.78	5.63	....	....	....	....
St. Louis	4.61	5.46	6.22	[illegible]	6.02	4.96	4.76	4.76	5.67	8.92	9.07	10.22	10.37
Pittsburgh	4.25	5.10[1]	5.65	4.35	....	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
St. Paul	4.68	5.53	6.08	4.78	....	5.03	4.83	4.83	6.00	....	....	....	....
Omaha	5.262	....	6.712	5.362	....	5.612	5.412	5.412	6.112	....	....	....	....
Indianapolis	4.55	5.38	5.93	4.65	5.95	4.90	4.70	4.70	5.57	....	....	....	....
Birmingham	4.45[11]	....	5.80	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	6.13	....	....	....	....
Memphis	4.88[11]	5.94[1]	6.43	5.08[11]	....	5.23[11]	5.03[11]	5.03[11]	5.94	....	....	....	....
New Orleans	*5.05[11]	6.39[1]	....	5.25[11]	....	5.40[11]	*5.10[11]	*5.20[11]	6.39[6]	....	....	....	....
Houston	5.55	....	7.05	5.65	....	5.90	5.70	5.70	7.00	9.40	9.25	10.40	10.55
Los Angeles	5.75	7.35[1]	7.40	6.05	8.70[5]	5.55	5.35	5.50	7.35[14]	9.70[15]	9.55[10]	11.15[15]	11.30[15]
San Francisco	5.40[8]	6.65	7.05	5.75[8]	8.70	5.50	5.30	5.05	7.50	9.70[15]	9.55[15]	11.15[15]	11.30[18]
Seattle	5.45[4]	7.25[2]	7.10	5.60[4]	....	5.90	5.25[4]	5.45[4]	7.45[14]	....	8.95[16]	....	11.30[18]
Portland	5.45[4]	7.25[2]	7.10	6.15[4]	....	5.70[4]	5.40[4]	5.65[4]	7.45[14]	....	9.70[15]	....	11.30[15]
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.55[9]	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Up to ¾ in. thick and 90 in. wide

‡ Add 38¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40.00	40.50	41.00	41.50	....	Boston	Everett	$0.50 Arb.	....	45.50	46.00	....	....
Birmingham	38.88	38.38-39.38	....	....	....	Boston	Steelton	5.78	45.78	....	....	....	51.78
Buffalo	40.00-41.88*	40.00-42.38*	40.50-42.88*	....	....	Brooklyn	Bethlehem	3.60	43.60	44.10	44.60	45.10	....
Chicago	38.50	39.00	39.50	40.00	....	Cincinnati	Birmingham	5.85	44.73	42.23-45.23	....	....	....
Cleveland	38.50-39.75*	39.00-40.25*	39.50-40.75*	....	....	Jersey City	Bethlehem	2.21	42.21	42.71	43.21	43.71	....
Duluth	39.00	39.50	40.00	40.50	....	Los Angeles	Provo	7.13	46.13	46.63	....	....	....
Erie	38.50	39.00	39.50	40.00	....	Mansfield	Cleveland-Toledo	2.56	41.06-42.31*	41.56-42.81*	42.06-43.31*	42.56	....
Everett	....	45.00	45.50	....	....	Philadelphia	Bethlehem	2.00	42.00	42.50	43.00	43.50	....
Granite City	39.50	40.00	40.50	....	....	Philadelphia	Swedeland	1.21	46.21	46.71	47.21	47.71	....
Neville Island	39.00	39.50	39.50	40.00	....	Philadelphia	Steelton	2.59	42.59	....	....	....	48.59
Provo	39.00	39.50	....	....	....	San Francisco	Provo	7.13	46.13	46.63	....	....	....
Sharpsville	39.00	39.50	39.50	40.00	....	Seattle	Provo	7.13	46.13	46.63	....	....	....
Steelton	40.00	....	....	....	46.00	St. Louis	Granite City	0.75 Arb.	40.25	40.75	41.25	....	....
Struthers, Ohio	39.50	....	....	....	....								
Swedeland	45.00	45.50	46.00	46.50	....								
Toledo	38.50	39.00	39.50	40.00	....								
Troy, N. Y.	....	....	....	....	46.00								
Youngstown	39.00	39.50	39.50	40.00	....								

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$49.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $62.46. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$145
Less ton lots (packed)	189.00
Delivered Pittsburgh	151.00

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$51.00	$52.00
F.o.b. Pittsburg.h.	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C., 7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk	7.80
Ton lots	9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $78.00, foundry, $79.00; $78.75 f.o.b. Niagara Falls; $77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe..	16.90	17.50	18.10
97% Si, 1% Fe..	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50	....	....
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75
65-69% Cr, 4.9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C.	97.00	98.50	99.75
0.50% max. C.	93.00	94.50	95.75
9.00% min. C.	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.85	$2.70	$3.40
Less ton lots	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-500% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.25
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2	$1.20
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo.	80¢
Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
Less ton lots	$1.25
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	18.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.90¢
Ton lots	7.40¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.50¢
Ton lots	10.35¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern	Central	Western
$1.20	$1.23	$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$1.80	$1.8125	$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.0¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B	$6.25

Canadian Aluminum Co. 1948 Output Remaining At Same Levels As 1947

New York

● ● ● **The Aluminum Import Corp.,** American selling agents for the Canadian aluminum producer, Aluminum Ltd., has announced that no increase in production of primary aluminum by that company may be expected during 1948. Operations will continue throughout the year at about 55 pct of the wartime peak production rate. The Canadian firm now states that it considers this rate to be "full economic capacity operation".

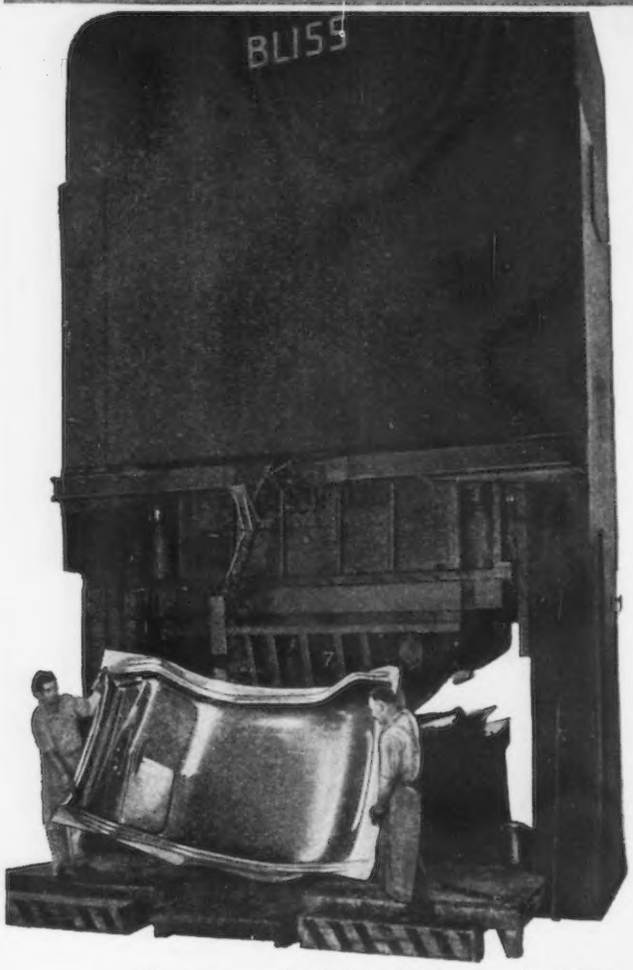
The company states that power shortages which have been plaguing U. S. producers have been less important factors at their main production plant at Arvida, Que. The indication by the firm is that at the moment the water supply for power generation is normal.

Minimizing the complaints made by some sources in the United States that Canadian shipments were a disrupting influence in the market here, the company points out that on a net basis, the United States in 1947 exported a combined total of 124,298,000 pounds of aluminum ingot, sheet, plates and strips, or some four times as much aluminum as the 31,160,000 pounds of ingot brought into this country.

Since the end of World War II, the Canadian aluminum production has been subjected to wide swings in demand from the U. S. market. At one period complaints were voiced that Canadian aluminum was a serious competitor of U. S. metal, in spite of the tariff wall. Only a few months later, however, as demand for aluminum ingot rose, the swing produces a situation in which U. S. producers and fabricators were actively seeking more Canadian aluminum than was available. This situation has been intensified with the growing power shortage in the United States, and there is little indication of any easing in the demand for the light metal in the domestic market. As long as shortages continue in steel and copper, aluminum will be depended upon to fill the requirements if the present high level of industrial activity continues.

As for the 606,420,000 pounds produced last year in Canada, this was the largest peace-time output of the aluminum industry in the Dominion and as an indication of

Why 75% of Large Detroit



Turret top completely formed with one stroke of Bliss enclosed toggle press after being removed from die.

Counsel on right press for job and prompt service are big factors

Over 100 Bliss presses of all types and sizes fabricate a diversified line of steel products in the Detroit plant of one of America's largest producers of automotive parts and home appliances. These presses range from the 40-ton Bliss inclinable press shown blanking parts for a home-appliance unit to the 1400-ton triple-action toggle press which forms the turret tops of low, medium and high priced cars.

Some of the ways Bliss presses are kept busy in this plant are shown in the accompanying photos...75% of the presses on its floors are Bliss-Built.

Two of a battery of 13 Bliss straight-side double-crank presses are shown forming pillars.

1400-ton triple-action enclosed toggle presses form turret tops. Press has four points of pressure on blankholder slide; is made of stress-relieved steel.

Stamper's Presses are BLISS

Selection of the right press for the specific job is made only after careful study and recommendations by the Bliss engineering staff, according to this plant's press-room superintendent. It is this ever-expanding fund of knowledge, over 90 years in the making, that has made Bliss the first choice of stampers the world over. "Ranking next in importance," he says, "is Bliss' prompt service when parts have to be replaced or the presses serviced."

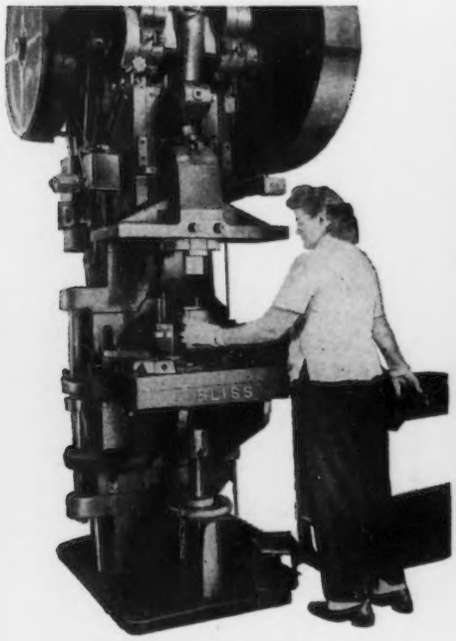
It's another reason why the pressed metal industry knows that Bliss on a Press Is More Than a Name—It's a Guarantee!...why it pays *you* to put your press problem up to Bliss.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

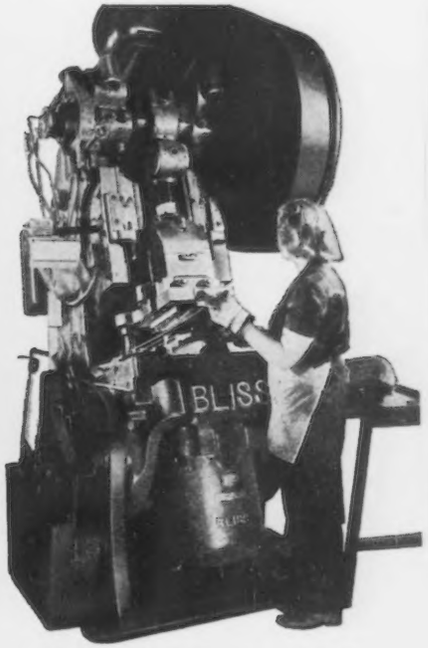
WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France • SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.

Trimming the turret top in a 4-point enclosed single action press with 160" wide bed. Press has 650 tons capacity. Operation is by electric push-button. Operators simply load and unload.



A Bliss adjustable bed press of 40 tons capacity is shown being used for general punch press work.

Deep pillars are drawn in Bliss No. 795½ Toggle Press. "The finest drawing press on the market," according to the pressroom superintendent.



Blanking salvaged scrap steel in No. 21½ Inclinable Press. Die cushion in bed permits shallow drawing.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

STAY AHEAD WITH *Bliss*

its growth, the figure may be compared with the 128,000,000 pounds turned out in 1938, the last of the pre-war years.

In addition to being the world's largest exporter of aluminum ingot and the second largest producing nation among the many countries in the industry, Canada today has more than 1000 processing and fabricating plants working with the light metal.

During 1947, 10 per cent of the total sales volume of Canadian aluminum represented new uses for the metal. This spring, for example, nine ships are scheduled to set sail from Canada to go into service in China. The superstructures of these vessels are made of aluminum and represent the largest aluminum shipbuilding job ever taken.

Progress has been made through research in adapting aluminum to solve the many problems facing the production engineers who convert trees into newsprint. The applications of aluminum to pulp and paper manufacture include aluminum heat exchangers, ventilating disks, flakt driers, conduit, paper machine hoods, rolls, and other devices.

GM Report Shows Big Increase in Employment

Detroit

● ● ● **An increase** of 75,000 in the number of salaried and hourly-rated employees and payrolls 33 pct higher than a year ago are indicated in the annual report of General Motors Corp. recently released to stockholders.

According to C. E. Wilson, president, GM averaged 375,689 salaried and hourly-rated workers last year compared with an average of 300,634 in 1946 and 303,827 in 1941.

According to the report, GM payrolls have increased more than 70 pct since 1941, aggregating $1,155,388,163 in 1947 compared with $669,744,870 in 1941. The 1946 total was $870,215,992.

Average weekly earnings of GM hourly-rated employees in the United States in 1947 totaled $57.86 compared with $53.93 during 1946. However, the employees worked fewer hours, averaging 38.3 hr per week in 1947 and 38.5 hr for the last 9 months of 1946. GM attributed the shorter hours to the combined effects of material shortages and absenteeism. Rate of absenteeism

was about double the prewar average rate, GM said.

Less than 0.03 pct of available working time was lost during the year as a result of labor disputes with its 18 unions, GM reported. "This is much the best record achieved since the unions have had bargaining rights," GM said.

According to General Motors, 90 pct of all eligible GM employees have enrolled in its revised group insurance plan prior to the recent UAW-CIO charges that the insurance plan be made a subject of collective bargaining. According to General Motors, 18 unions other than UAW-CIO have accepted the GM insurance offer.

Revere Reports 1947 Income At $8,112,536

New York

• • • **The annual report** of Revere Copper & Brass Inc. for the year ended Dec. 31, 1947, shows net income after all charges including depreciation and federal income taxes of $8,112,536, equivalent after dividend requirements on preferred stock to $5.93 a share on the common. This compares with $4,963,287 or $3.48 per share for 1946.

Current assets of $33,135,791 compare with current liabilities of $5,622,052, as shown by the balance sheet.

During 1947 Revere continued its program for the improvement and expansion of facilities by capital expenditures of $3,081,992. The management anticipates that expenditures for plant improvement and expansion in 1948 will exceed those for 1947.

New Materials Combined For Navy Ship Lighting

Pittsburgh

• • • **Fire and shock,** the greatest enemies of lighting units aboard fighting ships are combatted by two new types of luminaries developed by Westinghouse now being tested on Navy vessels. The new units are designed not only to give the Navy the best lighting ever seen aboard ship but to withstand 2000 ft-lb shock impact and extreme heat. Even when enveloped in fire, the plastic-glass material used in the new fixtures produces chiefly nitrogen, an inert gas that smothers flames.

The plastic-glass material used in the new fixtures to both reflect and

transmit light is called glass melamine Micarta and was developed during the war by Westinghouse plastics experts for building electrical control boards for Navy ships. Ten layers of glass cloth are coated with melamine resin, a glue-like substance with a cynamid base to make the thin, strong reflectors. These layers are then pressed together and heated. At the same time, they are formed into round and curved shapes as necessary.

Fluorescent fixtures are about 2 ft long with curved sides made of glass melamine Micarta. The rest of the unit is made of aluminum finished in white enamel. The fixture directs light downward to the work plane and also permits sufficient indirect light to escape through the translucent plastic-glass sides to provide general room illumination.

Barium Steel Profits For Beginning of '48 Soar Up to $800,000

New York

● ● ● **Current earnings** of the Barium Steel Corp. are the largest in the history of the corporation, according to their annual report. Net profit of the corporation, before taxes, for the first 2 months of this year is estimated in excess of $800,000 as compared with approximately $400,000 in the same period of 1947.

The consolidated net income of Barium Steel Corp. for the year ended Dec. 31, 1947, as shown in the report, amounted to $1,689,213, or 85¢ a share, after providing $1,177,416 for federal and state income taxes, as compared with net income of $11,844 for the year ended Dec. 31, 1946.

The eighteen operating subsidiaries of the Barium Steel Corp. have a combined backlog of orders on hand of approximately $20 million and the report states: "Substantial progress has been made in paying off the current indebtedness of the corporation incurred in connection with the acquisition of a number of subsidiary companies."

The productive capacity of the rolling mills of the Barium subsidiary, the Central Iron & Steel Co. of Harrisburg, Pa., will be increased by not less than 25 pct as a result of improvements and new installations made during the year.

NEWS OF INDUSTRY

Ratio of Earnings To Sales Drops Despite Highest Sales Record

Pittsburgh

• • • **Despite the** highest total of sales in the company's history and a new peacetime record of steel production, National Steel Corp.'s ratio of earnings to sales continued to decline during 1947, according to the Company.

National Steel's ratio of earnings to sales was 8.16 pct for 1947, compared with 8.53 pct in 1946 and an average ratio of 9.64 pct in the prewar years of 1936 to 1941.

In pointing out the declining ratio of earnings to sales, E. T. Weir, chairman, stated, "Thus, it is clear that the increased earnings of 1947, in terms of dollars, are due solely to the increase in the volume of production and sales."

The provision for depreciation and depletion in 1947 was $12,853,-292, compared with $8,192,976 in 1946. The 1947 charge includes a regular provision of $9,353,292 and a special provision of $3,500,000 which was made in order to compensate partially for the present higher costs of replacement.

Concerning this special provision, Mr. Weir stated, "Under federal tax laws charges for depreciation and depletion generally can be made only on a basis of actual cost. Therefore, we received no tax credit on the special provision of $3,500,000.

"We believe it is unfair on the part of the government not to recognize the higher costs now prevailing by allowing a proper increase in the tax deductible amount which could be charged for depreciation and depletion.

"Industry has become increasingly aware of the necessity of making special provisions on account of the higher replacement costs during this period, but the failure of the government to allow tax deductions on such provisions creates a very definite hardship."

New construction likewise set a company record, with property additions for the year totaling $35,-265,688. While it was expected that the construction program would be largely completed during 1947, it developed that the continuing heavy demand for the company's products necessitated the adding of new projects to the program. Uncompleted construction at the end of the year amounted to $27 mil-

lion, making necessary a continuing large scale building program through 1948 in the firm's various operations.

Among the most important features of the program are the development of iron ore properties and the new Weirton coal mine; installation of additional electrolytic capacity; and construction of an oxygen plant.

Suggests to OIT Plugs For Export Loopholes

Washington

● ● ● **The Senate** Small Business exports subcommittee has submitted to the Office of International Trade nine specific recommendations for plugging up loopholes by which exports are shipped to Europe under fraudulent licenses.

Senator Martin, R., Pa., said his group will meet shortly with the OIT to work out other ways and means for making more difficult the illegal issuance, forgery, or other misrepresentation.

Among the recommendations were requirement that ports of principal shipments be named in applications, that licenses be sent directly to the customs collectors at those ports instead of to the exporters, comparison by OIT of port declarations with file copies of validated licenses, and varied revision of administrative procedures.

The recommendations speedily followed a hearing at which it was revealed that goods are being shipped to Europe by reputable exporters who have been issued fraudulent licenses (for a price) by persons purporting to have lines into Washington.

"I am amazed at the ease with which export licenses can be forged or faked," Mr. Martin said. "We must stop this practice, not only to protect legitimate exporters but to protect domestic economy and the ERP as well."

Books Cooler Contract

Pittsburgh

● ● ● **Dravo Corp.** here has received an order for the South African Steel Co., Johannesburg, for 6 crane cab coolers. The units will be installed on three soaking pit and three ladle cranes in the steel mill that is under construction for that company in South Africa.

Court Bans Unemployment Compensation To Strikers

Birmingham

• • • **Eighteen hundred** steelworkers, employees of the Tennessee Coal, Iron & Railroad Co. here, idle for a period in 1946 because of a coal mine strike at the company's mines, have been ruled ineligible for unemployment compensation for the time they were off the job.

The ruling, made by the Board of Appeals for the Alabama Dept. of Industrial Relations, pointed out that under Alabama law, men made idle by a labor dispute within their company cannot obtain unemployment compensation even though they are off the job through no action of their own.

Talks on Pipe Shortage

Pittsburgh

• • • **It is wrong** to assume that the tight situation in fabricated pipe and tubing is a "flash in the pan," according to William P. Witherow, president, Blaw-Knox Co. There has grown an awareness of the shortage of tubular goods as associated with handling liquid and gaseous fuels, he said. "Actually the growing demand for material of this type is tied to a long-range trend and reflects a widespread change throughout industry in its use of integrated piping systems as a means of materials handling in continuous and mechanized processes," Mr. Witherow declared.

"We must not assume, therefore, that the tight situation in this field is a 'flash in the pan,' or that it depends entirely on the backlog for the petroleum and gas industries. The role of piping is growing throughout all industry," he concluded.

Signs French Agreement

Washington

• • • **WAA has** signed an agreement with the French government under which France may purchase on a credit basis up to $50 million of domestic surplus property. Sales will be made subject to the rights of priority purchasers and on an equal basis with domestic non-priority purchasers.

PERSONALS

(Continued from page 112)

● **L. H. Gillette** has been appointed manager, heating section sales, transportation and generator division, Westinghouse Electric Corp. Mr. Gillette is headquartered in Meadville, Pa. He entered the Westinghouse graduate student training course in 1939. Upon completion of this course in 1940, he was assigned to the heating section sales department where he has remained until his appointment as manager.

● **William P. Good,** former welding technician at Mid-States Equipment Corp., Chicago, has been appointed head of the department of applied welding engineering, and **Virgil Carlson,** recently returned from government service, is the new director of the electrical engineering department.

● **S. L. Gabel** has resigned as general manager of Superior Tube Co., Norristown, Pa., but will continue to make available to the company his advice and counsel as administrative consultant. **Clarence A. Warden** has resigned as president of the company, but continues as chairman of the board. **Clarence A. Warden, Jr.** has been elected president, having formerly served as vice-president and secretary. **Paul E. Kelly** has been elected secretary, which position he now combines with his former position of treasurer.

● **Howard G. Coates,** associated with Nash Motors Div., Nash-Kelvinator Corp., Detroit, for 28 years, has been appointed factory superintendent of the Nash assembly plant at El Segundo, Calif. Mr. Coates will assume his new duties about May 1.

● **M. M. Yarrington** has been named general manager and **Fred C. Wittig,** assistant general manager of the Aeroil Products Co., West New York, N. J. Mr. Yarrington became Aeroil's sales and advertising director over 12 years ago. Mr. Wittig was made plant manager in 1936.

● **Alvan Macauley,** chairman of the board and director of Packard Motor Car Co., Detroit, has retired. **Henry E. Bodman** and **Robert B.**

PERSONALS

Parker have also retired from the company. Mr. Bodman has been a director and general counsel since 1917. Mr. Parker joined Packard in 1909. He became a director in 1931.

● **Harold H. Mueller** has joined the foundry service staff of the Meehanite Metal Corp., New Rochelle, N. Y. Mr. Mueller was formerly connected with the Minster Machine Co. and the Cincinnati Milling Machine Co. He will operate from the Cleveland office of the corporation.

● **D. H. Merry** has been appointed director of quality control engineering at the Kaiser-Frazer Corp. Detroit Engine Div. Formerly resident engineer, Mr. Merry was previously associated with Cadillac and Packard. He joined Kaiser-Frazer in 1946.

● **Arthur A. Clay,** comptroller of the Ohio Steel Foundry Co., Lima, Ohio, has resigned.

● **William H. Buch** has been appointed assistant personnel director of SKF Industries, Inc., Philadelphia. Mr. Buch was formerly labor relations manager of the Alloy, W. Va. plant of Union Carbide & Chemical Corp., assistant personnel director of General Cable Corp., and industrial relations director of Colt's Mfg. Co.

● **E. J. McMahon,** production manager of the Dearborn Chemical Co., Chicago, has been elected a director and vice-president. He succeeds **John W. Brashears,** who has retired.

● **A. W. Reynolds** has been appointed assistant to the executive sales manager for Southern Alkali Corp. and the Columbia Chemical Div. of Pittsburgh Plate Glass Co. Mr. Reynolds has been associated with the Columbia Chemical sales organization since 1931. He has served as sales statistician, office manager and in sales administration capacities with the Pittsburgh Plate's alkali producing unit. He will maintain headquarters at Pittsburgh.

● **James R. Butler** has been appointed western regional manager of sales promotion and **Frederick J. Blume,** eastern regional sales promotion manager for Rheem Mfg. Co. Prior to joining Rheem, Mr. Butler was factory representative for Westinghouse Electric Corp. He will make his headquarters in the

company's San Francisco office. Mr. Blume's headquarters will be in New York. He was formerly regional sales manager for Eastern Industries Corp. Inc.

● **Stuart W. Goodenough** has been appointed assistant manager of the manufacturers products sales department, Chicago, American Steel & Wire Co., succeeding the late **C. J. Quill.** Mr. Goodenough first entered the employ of American Steel & Wire in 1926. Since 1945 he has been on the staff of the general manager of sales in Cleveland.

● **James M. Barker,** chairman of the boards of the Allstate Insurance Co. and the Allstate Fire Insurance Co., has been elected to the board of directors of Allis-Chalmer Mfg. Co., Milwaukee, replacing **Alfred J. Kieckhefer,** president of the National Enamel & Stamping Co., who has resigned. **W. A. Roberts** and **W. C. Johnson,** executive vice-presidents of Allis-Chalmers, has been appointed to the executive committee of the board.

● **W. E. Quillian** has been appointed chief estimator and purchasing agent of the Salem Engineering Co.'s South West Branch at Fort Worth, Tex. Until his recent appointment, Mr. Quillian served as chief estimator in the company's main office.

● **Robert W. Walker** has been made supervisor of passenger traffic in the general traffic department of the B. F. Goodrich Co., Akron, Ohio. He succeeds **Charles V. Dunn,** who has been transferred to the southeastern division of the replacement tire sales division. Mr. Walker joined the company in 1933 and has been with the passenger traffic department since 1945.

● **Paul T. Skove,** chief purchasing agent of Perfection Stove Co., Cleveland, has been elected to the company's board of directors. He fills the vacancy created by the resignation of **Frank A. Gabriel,** sales manager, stove and heater division. The following members of the board of directors received promotions: **D. S. Smith,** from vice-president and treasurer to executive vice-president and treasurer; **A. J. Tener,** from secretary and assistant treasurer to vice-president, secretary and assistant treasurer; **C. A. Blackburn,** from works manager to vice-president and director of manufactur-

PERSONALS

ing; **C. H. Foulds,** from general sales manager to vice-president and director of sales; and **Marc Resek,** from chief engineer to vice-president and director of engineering. Mr. Skove also continues as assistant secretary of Perfection Stove Co.

• **W. K. Millholland, Jr.,** has succeeded to the management of the W. K. Millholland Machinery Co., Indianapolis, following the recent death of **William K. Millholland, Sr.** Mr. Millholland, Jr., has been in charge of the firm's operations during the past 4 months.

• **R. P. Tennes** has been appointed president of the Shafer Bearing Corp., Downers Grove, Ill. **M. J. Tennes, Jr.** has been appointed vice-president and factory manager; **H. E. Tennes,** treasurer; **I. B. Lipson,** secretary; **H. R. Lucas,** comptroller; **A. H. Williams,** chief engineer; **O. W. Schmidt,** sales manager; and **J. J. Friedrich,** purchasing agent.

• **John R. Hickman** has been appointed director of field sales personnel of the B. F. Goodrich Co., Akron, Ohio. He succeeds **Dale Kramer,** who has been granted a temporary leave of absence. Mr. Hickman has been with the company since 1944 and had been manager of employees' services since 1946.

OBITUARIES

• **John A. Sender,** vice-president of Castaloy Corp., Detroit, died recently.

• **Charles M. Gunn,** 77, first president of the Columbia Steel Co. and founder and retired president of Gunn, Carle & Co., San Francisco, died Feb. 25.

• **R. Wallace Hook, Sr.,** 56, vice-president of F. L. Jacobs Co., Detroit, died recently.

• **Joseph H. Slater,** 54, assistant manager, Cleveland district, Republic Steel Corp., and chairman of the company's blast furnace and coke plant committee, died suddenly Mar. 8.

• **Albert J. Glaeser,** secretary-treasurer of Savary & Glaeser, Inc., Dunellen, N. J., died Feb. 24.

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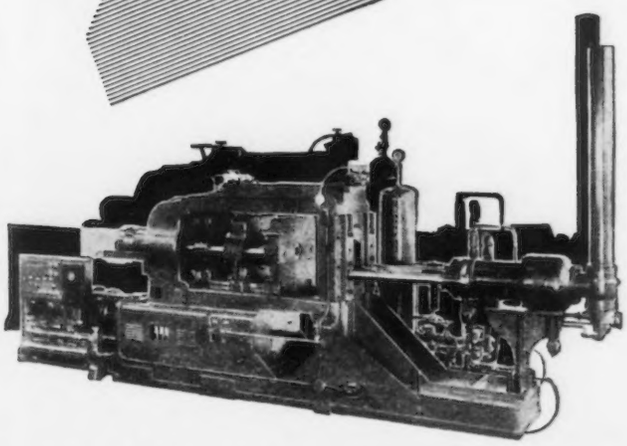

More and more of the die casting machines built by Lester-Phoenix are being ordered by customers who already have a Lester in operation. One of the companies to whom a second HHP-3-x-S, with prefill, will soon be shipped, is New Products Corporation of Benton Harbor, Michigan. There, the first Lester has been running successfully for months. The second machine is the *proof* of this superior performance! Whether your needs are for the zinc-lead-tin type of die casting machine, or for the aluminum-magnesium-brass type, you can be sure that a Lester-Phoenix is second to none. Complete specifications will be furnished on request.

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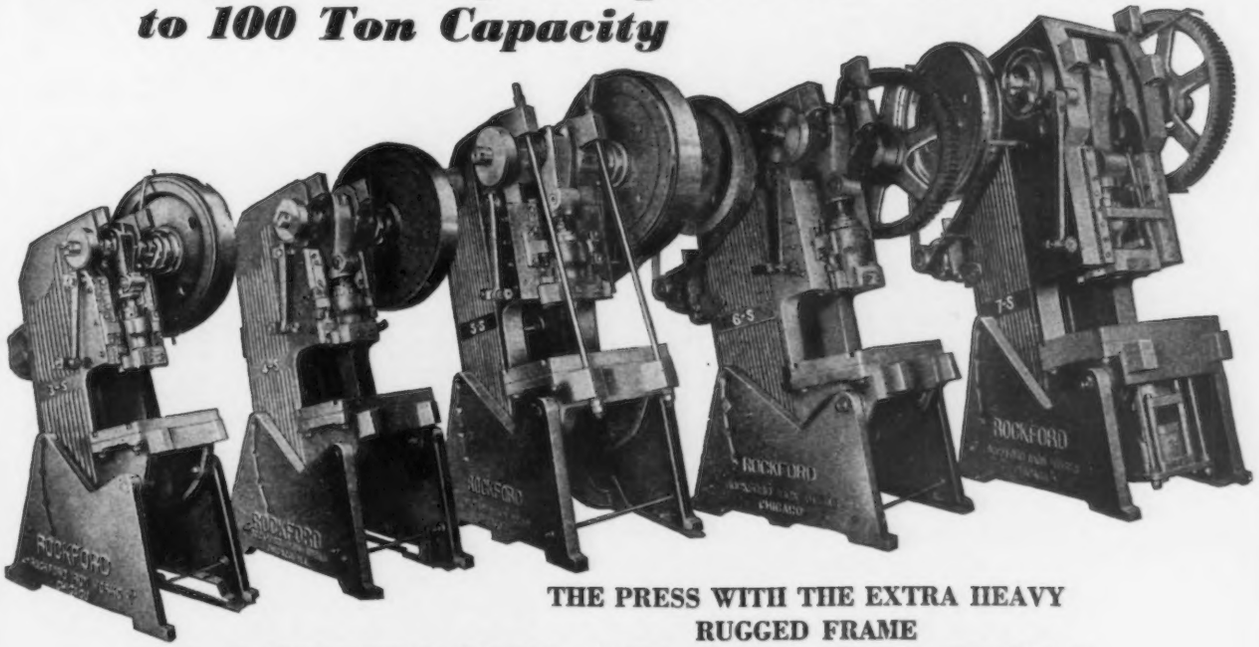

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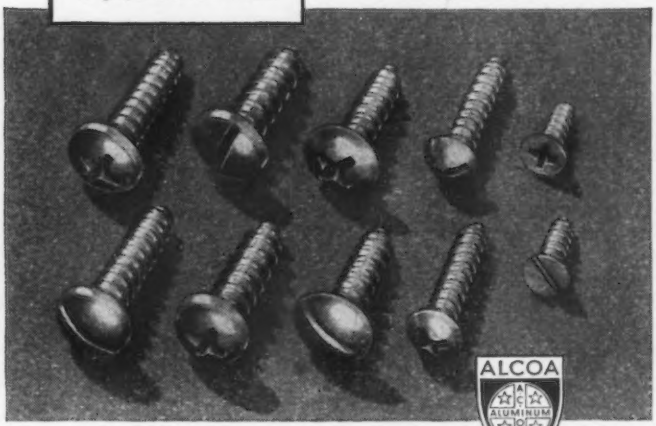

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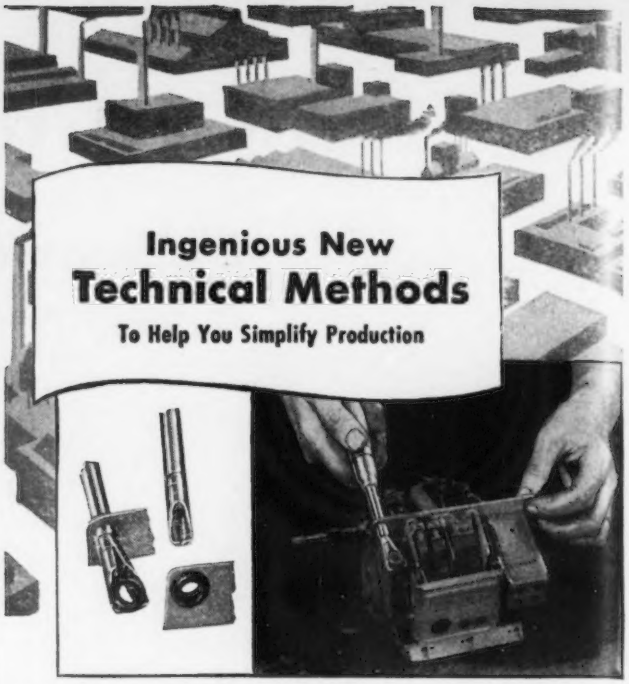
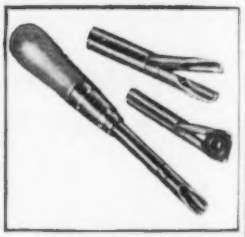


Ingenious New Technical Methods

To Help You Simplify Production

New Tool Inserts Rubber Grommets Quickly . . . Easily!

A new tool called a Grommet Inserter is shown above inserting a rubber grommet in a Sub-Chassis of a Zenith 7H820 Table Model Radio. The inset illustrates a close up view of the Grommet Inserter before and after the grommet has been inserted.



Grommet Inserter

Anyone can insert grommets in an instant with the new Grommet Inserter. Saves time, labor, and assures perfect fit. No longer is it necessary to use the time-consuming, cumbersome method of insertion by hand. The new Grommet Inserter does it efficiently.

Simple as A-B-C. All you do is push the Grommet Inserter through the hole, open jaws, place grommet in jaws, and pull back—leaving grommet firmly in place, and perfectly fitted. Comes in four standard sizes: 1/4″, 5/16″, 3/8″, 7/16″. Can be furnished in any special sizes to order.

You can count on chewing gum, too, to help step up employee's on-the-job efficiency. Chewing gum helps relieve tension and thereby enables him to work quicker and easier while leaving hands free. That's why more and more plant owners are making Wrigley's Spearmint Gum available to everyone.

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